

**APPENDIX A**  
**EXPLORATION SYSTEMS ARCHITECTURE STUDY DESIGN REFERENCE**  
**MISSIONS FOR THE CREW EXPLORATION VEHICLE**

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## APPENDIX A

### EXPLORATION SYSTEMS ARCHITECTURE STUDY DESIGN REFERENCE MISSIONS FOR THE CREW EXPLORATION VEHICLE

The National Aeronautics and Space Administration (NASA) Exploration Systems Architecture Study (ESAS) Team was established to determine the best exploration architecture and strategy to implement the President's exploration initiative (the *Vision for Space Exploration*) as announced in his January 2004 address (TWH 2004). This initiative encompassed a plan to return humans to the Moon by no later than 2020 in preparation for human exploration of Mars and beyond. As a part of NASA's future human space exploration strategy, the Space Shuttle was to be retired by no later than 2010 and be replaced by a new human-rated spacecraft, the Crew Exploration Vehicle (CEV) (since named Orion). The CEV was to begin operations with first human flights by no later than 2014 (NASA 2004). The ESAS team was required to perform four specific tasks:

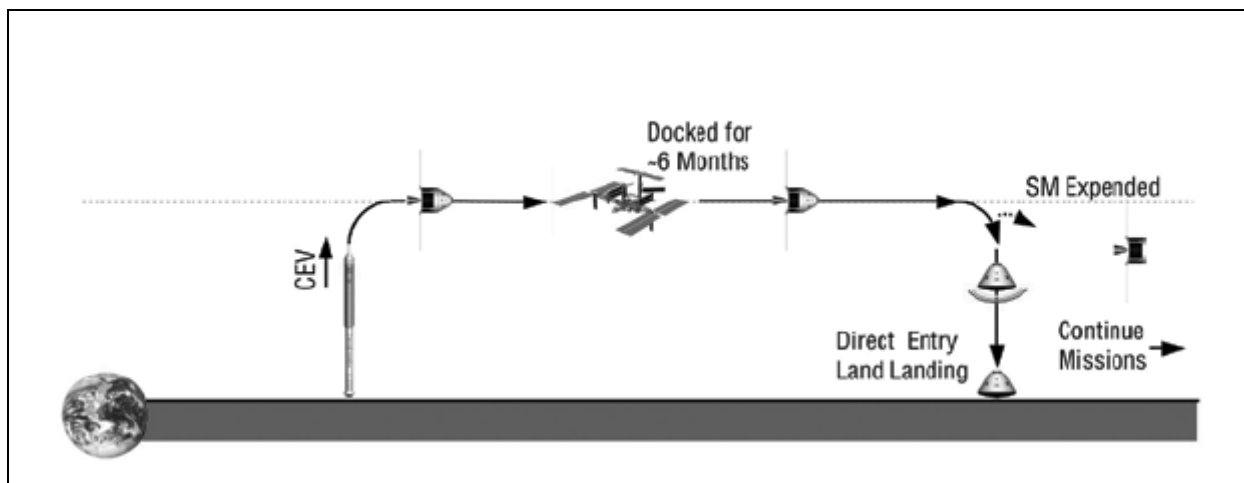
- Complete assessment of the top-level CEV requirements and plans to enable the CEV to provide crew transport to the International Space Station and to accelerate the development of the CEV and crew launch system to reduce the gap between Space Shuttle retirement and CEV initial operational capability
- Provide definition of top-level requirements and configurations for crew and cargo launch systems to support the lunar and Mars exploration programs
- Develop a reference lunar exploration architecture concept to support sustained human and robotic lunar exploration operations
- Identify key technologies required to enable and significantly enhance these reference exploration systems and reprioritize near- and far-term technology investments.

The ESAS (NASA 2005) addressed the following four major items: CEV definition, launch vehicle definition, lunar architecture definition, and technology plan definition. Aspects addressed included cost, requirements, ground operations, mission operations, human systems, reliability, and safety. The ESAS team examined multiple combinations of launch elements (e.g., duration, destination, flight sequence, systems, and technologies required to undertake and complete a particular mission) to establish Design Reference Missions that would facilitate the development of the CEV. There are six Design Reference Missions applicable to the Proposed Action, as summarized below (NASA 2005).

#### A.1 CREW TRANSPORT TO THE INTERNATIONAL SPACE STATION

The purpose of this mission would be to transport three International Space Station crew members, and up to three additional temporary crew members, to the International Space Station for a 6-month stay and return them to Earth at any time during the mission (Figure A-1). The CEV, consisting of a Crew Module, Service Module, Launch Abort System, and Spacecraft Adapter (Figure A-2), would be launched by the Crew Launch Vehicle (CLV) (since named Ares I) (Figure A-3) into Earth orbit, where the CEV would perform a series of burns and maneuvers to close on and dock with the International Space Station. Once ingress activities are complete, the CEV would be configured to a quiescent state for the duration of the crew's assignment aboard the International Space Station. Upon completion of their assignment, the

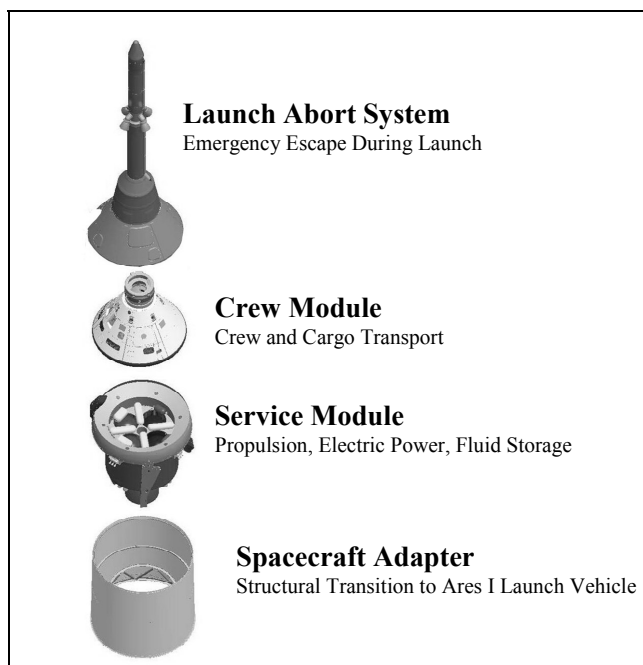
crew would return to the CEV and the CEV would undock from the International Space Station. The CEV would depart the vicinity of the International Space Station and would conduct a deorbit burn. After burn completion, the CEV Service Module would be expended, and the CEV Crew Module would be maneuvered to perform a terrestrial (land-based) landing at a designated site.



Note: Abbreviations and acronyms are defined on page xx.

Source: NASA 2005

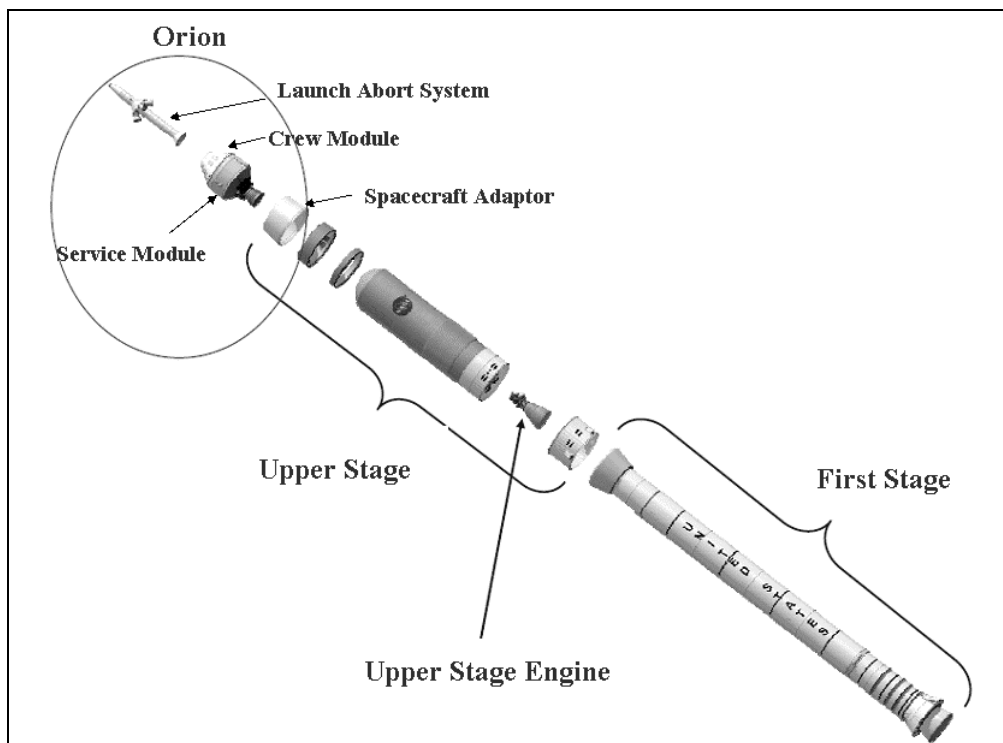
**Figure A-1. Normal Crewed Mission to the International Space Station**



Source: JSC 2007

**Figure A-2. Crew Exploration Vehicle Elements**





Source: Adapted from MSFC 2007

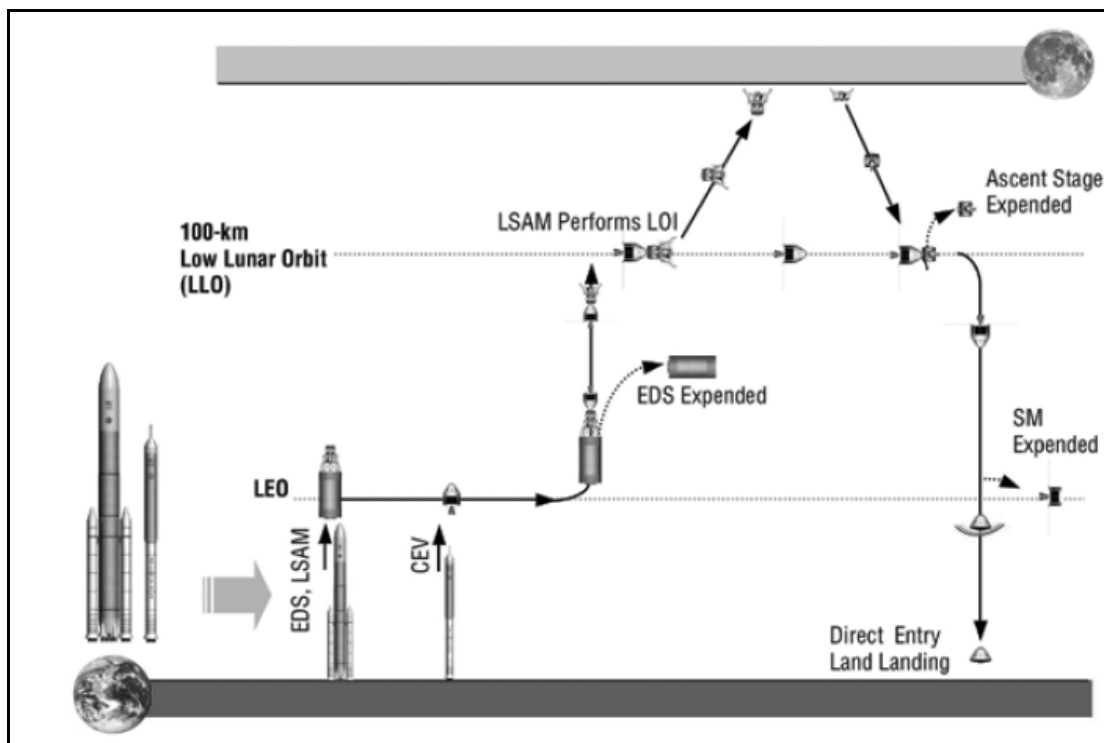
**Figure A-3. Ares I in Launch Configuration**

## **A.2 CARGO TRANSPORT TO THE INTERNATIONAL SPACE STATION**

The purpose of this mission would be to transport pressurized cargo to the International Space Station and return pressurized cargo to Earth after 90 days. The general mission sequence is similar to that depicted in Figure A-1, except the duration is shorter. A cargo version of the CEV would be launched by the CLV into orbit, filled with up to 3,500 kilograms (kg) (7,700 pounds [lb]) of materiel. The uncrewed CEV would perform a series of burns and maneuvers to close on and dock with the International Space Station. Once ingress activities are complete, the CEV systems would be configured to a quiescent state and the CEV cargo would be offloaded by the International Space Station crew. Upon completion of the docked phase lasting up to 90 days, the International Space Station crew would stow any return items in the CEV pressurized cabin, and Mission Control would command the CEV to undock. The CEV would depart the vicinity of the International Space Station and would conduct a deorbit burn. After burn completion, the CEV Service Module would be expended, and the unoccupied CEV Crew Module would be maneuvered to perform a terrestrial (land-based) landing at a designated site.

## **A.3 CREW AND CARGO TRANSPORT TO THE MOON FOR SHORT-TERM MISSIONS**

The purpose of this mission would be to transport up to six crew members to any site on the Moon (*i.e.*, global access) for up to 7 days (Figure A-4). This short-term mission would be analogous to the Apollo surface missions. It would demonstrate the capability to land humans on the Moon, operate for a limited period on the surface, and safely return to Earth.



Note: Abbreviations and acronyms are defined on page xx.

Source: NASA 2005

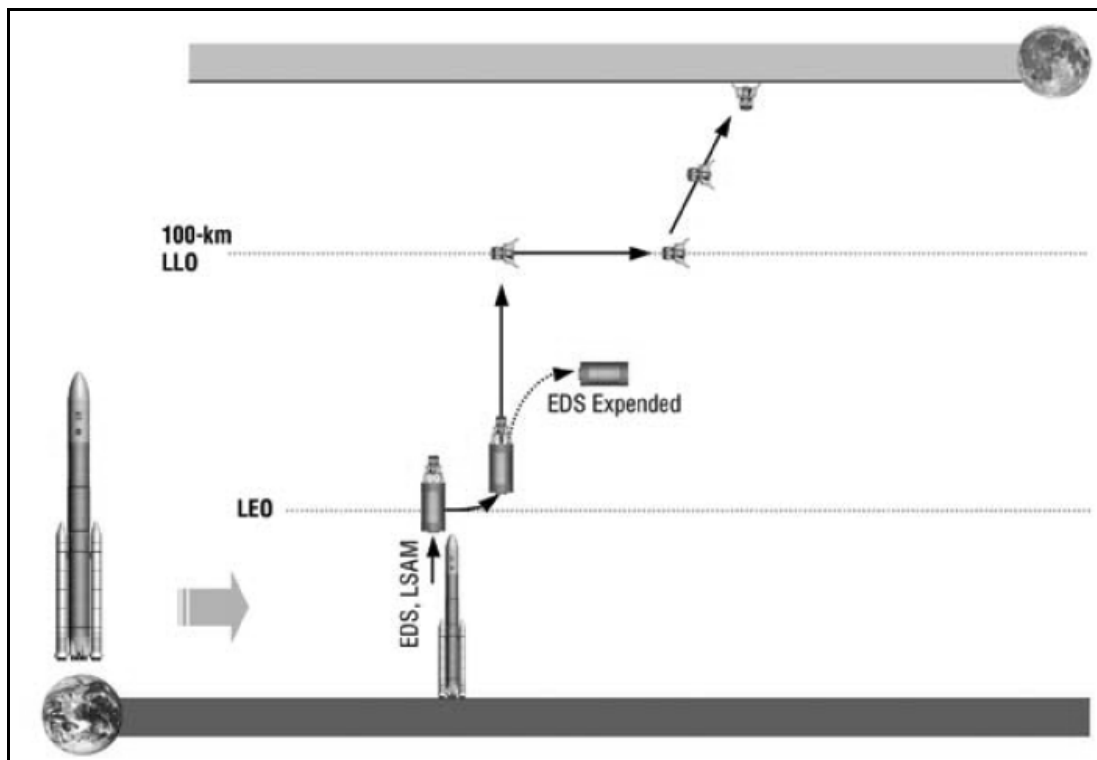
**Figure A-4. Normal Crew and Cargo Short-Term Lunar Mission (Sortie)**

The following transportation elements would be required to perform the mission: a CLV, a Cargo Launch Vehicle (CaLV) (since named Ares V), a CEV, a Lunar Surface Access Module (since named Lunar Lander), and an Earth Departure Stage. The mission sequence assumes a combination Earth orbit rendezvous and lunar orbit rendezvous. The Lunar Surface Access Module and Earth Departure Stage would be pre-deployed in a single CaLV launch to low Earth orbit, and the CLV would deliver the CEV and crew to Earth orbit where the Lunar Surface Access Module/Earth Departure Stage and CEV would rendezvous and dock. The Earth Departure Stage would perform a trans-lunar injection burn and would be expended. The Lunar Surface Access Module then would perform the lunar orbit injection for the CEV/Lunar Surface Access Module. The entire crew would transfer to the Lunar Surface Access Module, would undock from the CEV, and would descend to the lunar surface in the Lunar Surface Access Module while the CEV orbits the Moon. After up to 7 days on the lunar surface, the Lunar Surface Access Module would return the crew to lunar orbit where the Lunar Surface Access Module and CEV then would dock. The crew would transfer back to the CEV, and the Lunar Surface Access Module would be expended. The CEV would then return the crew to Earth with a direct entry and land at a designated terrestrial (land-based) landing site.

#### A.4 CARGO TRANSPORT TO THE MOON

The purpose of this mission would be to deliver up to 20 metric tons (mt) (22 tons) of cargo to the lunar surface in a single mission using the elements of the human lunar transportation system (Figure A-5). This capability would be used to deliver surface infrastructure needed for lunar outpost buildup (e.g., habitats, power systems, communications, mobility, in situ resource

utilization pilot plants) as well as periodic logistics re-supply packages to support a continuous human presence.



Note: Abbreviations and acronyms are defined on page xx.

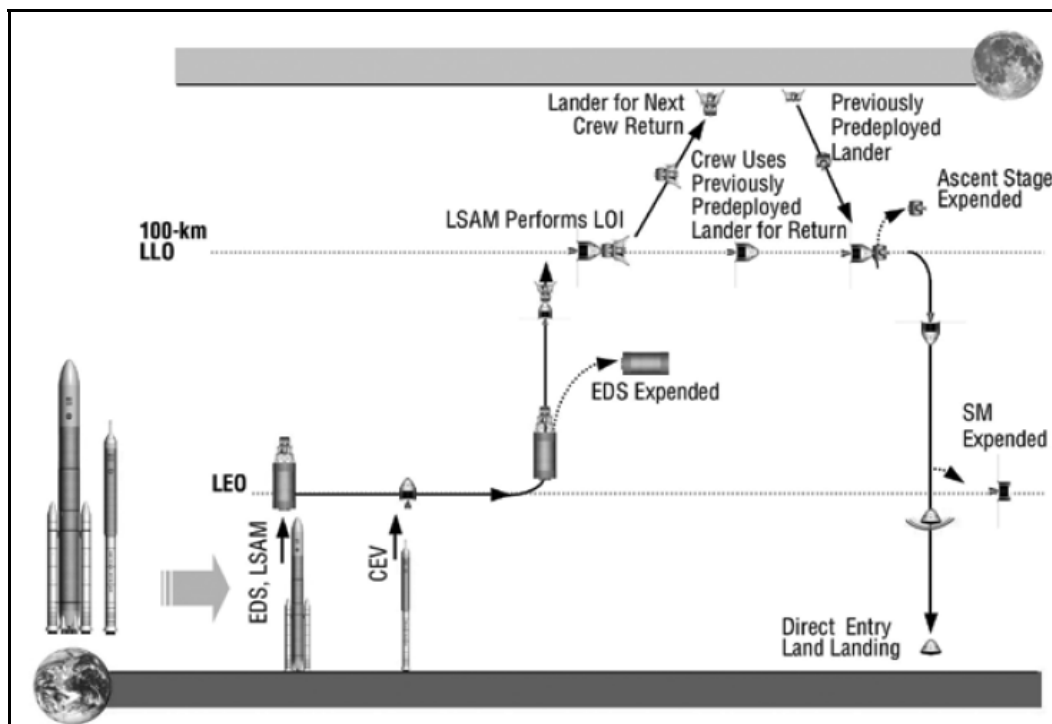
Source: NASA 2005

**Figure A-5. Normal Lunar Outpost Cargo Delivery Mission**

The following transportation elements would be required to perform the cargo transport mission: the same CaLV and Earth Departure Stage as the short-term lunar mission and a cargo variant of the Lunar Surface Access Module to land the large cargo elements near the lunar outpost site. The cargo variant of the Lunar Surface Access Module would replace the habitation module with a cargo pallet and logistics carriers. The Lunar Surface Access Module and Earth Departure Stage would be launched to low Earth orbit on a single CaLV. The Earth Departure Stage would perform the trans-lunar injection burn and would be expended. The Lunar Surface Access Module would then perform the lunar orbit injection and descend to the lunar surface. The cargo would then be offloaded from the Lunar Surface Access Module autonomously or by the outpost crew.

## **A.5 CREW AND CARGO TRANSPORT TO THE MOON FOR LONG-TERM MISSIONS**

The purpose of this mission would be to transfer up to six crew members and supplies in a single voyage to a lunar outpost site for an expedition lasting up to 6 months (Figure A-6). Every 6 months, the crew would change. The entire suite of transportation vehicles developed to support a short-term lunar mission also would be required for lunar outpost missions. The mission sequence assumes a similar approach as described for the short-term lunar mission except for duration.



Source: NASA 2005

Note: Abbreviations and acronyms are defined on page xx.

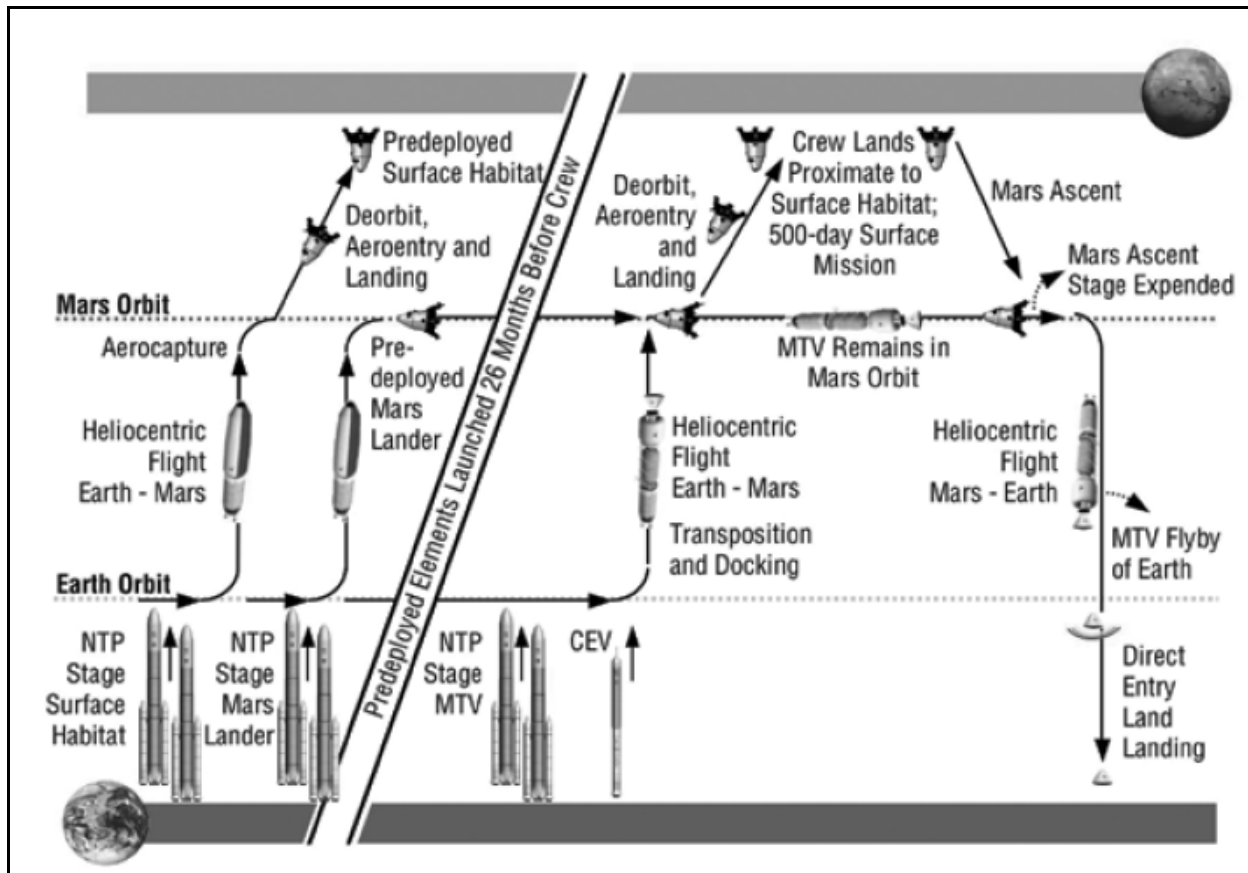
**Figure A-6. Normal Lunar Outpost Crew and Cargo Delivery Mission**

## A.6 CREW AND CARGO TRANSPORT TO MARS

The purpose of this mission would be to establish a continuous human presence on the surface of Mars. The mission sequence would involve a split-mission concept in which cargo would be transported in manageable units to the Mars surface or orbit, and checked out in advance of launching the crew. The split-mission approach would allow the crew to be transported on faster, more energetic trajectories, minimizing their exposure to the deep-space environment, while the vast majority of the materiel sent to Mars would be sent on minimum energy trajectories. Each human mission to Mars would be composed of three vehicle sets: two cargo vehicles and one round-trip piloted (crewed) vehicle (Figure A-7).

The CEV with a crew of up to six would be launched by the CLV into low Earth orbit and would perform a series of burns and maneuvers to close on and dock with the pre-deployed Mars Transfer Vehicle. Once crew and cargo transfer activities are complete, the CEV would be configured to a quiescent state. Periodic systems health checks and monitoring of the CEV would be performed throughout the Mars transfer mission.

As the Mars Transfer Vehicle approaches Earth upon completion of the (up to) 2 ½ year mission, the crew would transfer to the CEV and would undock from the Mars Transfer Vehicle. The CEV would maneuver to the proper entry attitude, and would perform a landing at a designated site.



Source: NASA 2005

Note: Abbreviations and acronyms are defined on page xx; Nuclear Thermal Propulsion (NTP) not within the current planning horizon of the Constellation Program.

**Figure A-7. Normal Mars Exploration Mission**

## A.7 REFERENCES

- JSC 2007. National Aeronautics and Space Administration. Personal communication between M. See (NASA JSC) and R. Wickman (NASA HQ) regarding updated CEV 606 configuration graphics. April 29, 2007.
- MSFC 2007. National Aeronautics and Space Administration. *Expanded Views of Ares I and Ares V*. Available at: [http://www.nasa.gov/pdf/146764main\\_CLV\\_CaLV\\_Description.pdf](http://www.nasa.gov/pdf/146764main_CLV_CaLV_Description.pdf). Accessed on May 7, 2007.
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TWH 2004. The White House. *A Renewed Spirit of Discovery. The President's Vision for U.S. Space Exploration*. Available at: [http://www.whitehouse.gov/space/renewed\\_spirit.html](http://www.whitehouse.gov/space/renewed_spirit.html). January 2004.

**APPENDIX B**  
**RESPONSES TO DRAFT PEIS PUBLIC REVIEW COMMENTS**

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## APPENDIX B

### RESPONSES TO DRAFT PEIS PUBLIC REVIEW COMMENTS

The Notice of Availability of the *Draft Constellation Programmatic Environmental Impact Statement* (Draft PEIS) was published in the *Federal Register* on August 17, 2007 (72 FR 46218). The National Aeronautics and Space Administration (NASA) mailed over 300 hard copies and/or compact disks (CDs) of the Draft PEIS to potentially interested Federal, state, and local agencies; organizations; and individuals. In addition, the Draft PEIS was made publicly available in electronic format on NASA's web site at [http://www.nasa.gov/mission\\_pages/constellation/main/peis.html](http://www.nasa.gov/mission_pages/constellation/main/peis.html). NASA also sent electronic mail (e-mail) notifications to potentially interested individuals who had submitted scoping comments via e-mail but who had not provided a mailing address.

The public review and comment period for the Draft PEIS closed on September 30, 2007. NASA received a total of 21 submissions (letters and e-mails) from Federal, state, and local agencies; organizations; and an individual, of which, 14 submissions contained comments regarding the Constellation Program. Seven submissions only requested to be added to the mailing list to receive a copy of the Final PEIS. Comments were received from the following Federal, state, and local agencies; organizations; and individual:

#### Federal Agencies

U.S. Environmental Protection Agency, Office of Federal Activities

U.S. Department of the Interior

*National Park Service*

*U.S. Fish and Wildlife Service*

#### State Agencies

New Mexico Department of Cultural Affairs, Historic Preservation Division

New Mexico Environment Department, Office of the Secretary

Maryland Department of the Environment, Science Services Administration

Maryland Department of Planning

Virginia Department of Environmental Quality, Office of Environmental Impact Review

#### Local Agencies

Brevard County Natural Resources Management Office, Florida

City of Madison, Alabama, Office of the Mayor

State of Ohio, Office of the Governor

#### Organizations

National Society of Black Engineers

The Space Frontier Foundation

#### Individual

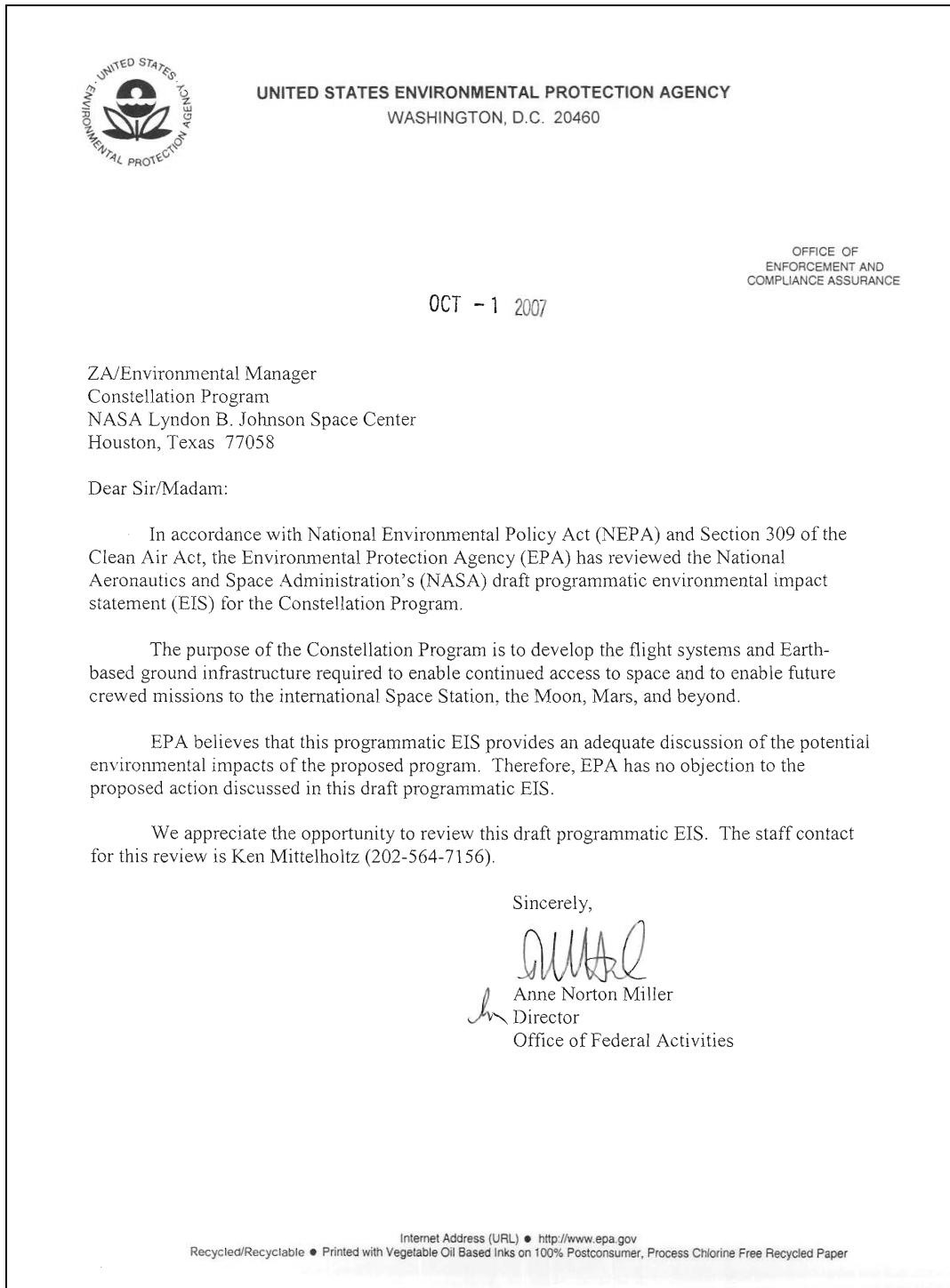
Rosetta M. Karlen

The comment submissions included concerns regarding:

- Establishing a light management plan at John F. Kennedy Space Center (KSC) in Florida
- Establishing a monitoring program for bird strikes at KSC
- Water quality, air quality, and hazardous wastes at the U.S. Army's White Sands Missile Range (WSMR) in New Mexico
- Performing a coastal zone consistency determination for Langley Research Center in Virginia
- Raising awareness of metals in the environment
- Environmental impacts in outer space, including impacts on the Moon.

This appendix provides copies of the 14 comment submissions along with NASA's responses. The names of the individuals who only requested a copy of the Final PEIS are included in Chapter 7 of this Final PEIS. No alternatives to the Proposed Action (Preferred Alternative) were raised during the public review of the Draft PEIS.

**Comments from the U.S. Environmental Protection Agency:**



**Response to comments from the U.S. Environmental Protection Agency:**

Thank you for your comments.

**Comments from the National Park Service:**

From: John\_Stiner@nps.gov [mailto:John\_Stiner@nps.gov]  
Sent: Tuesday, September 25, 2007 9:03 AM  
To: Busacca, Mario (KSC)  
Cc: Rosemary\_Williams@nps.gov  
Subject: Comments on draft Constellation Programmatic EIS

Mario:

Thank you for the opportunity to review the draft Constellation Programmatic Environmental Impact Statement. The vast majority of the proposed actions would not result in new impacts to Canaveral National Seashore and require no further comment. As per mitigation measures, we were pleased to note that :

Any modifications to historic resources will be undertaken in consultation with the State Historic Preservation Officer.

The KSC lighting plan will be adhered to to protect nesting sea turtles. Several measures will be taken to reduce the number of bird and bat strikes at LC Pads 39 A and B. We suggest establishing a monitoring program to record bird strikes during major avian migration periods.

John Stiner

**Response to comments from the National Park Service:**

Thank you for your comments.

The John F. Kennedy Space Center (KSC) has an active, on-going monitoring program for all biological resources on the Center. As part of this program, KSC plans to add specific monitoring efforts to address potential bird strikes for all new tall structures constructed for the Constellation Program. This commitment has been previously documented in the Finding of No Significant Impact for the *Final Environmental Assessment for the Construction, Modification and Operation of Three Facilities in Support of the Constellation Program, John F. Kennedy Space Center, Florida*.

Comments from the U.S. Fish and Wildlife Service:



United States Department of the Interior

FISH AND WILDLIFE SERVICE  
6620 Southpoint Drive, South  
Suite 310  
Jacksonville, Florida 32216-0912

IN REPLY REFER TO:

FWS Log No. 41910-07-TA-0632

September 5, 2007

ZA/ Constellation Program Environmental Manager  
NASA Lyndon B. Johnson Space Center  
2101 NASA Parkway  
Houston, Texas 77058

FWS Log Number: 41910-2007-TA-0632

Dear Dr. Rhatigan:

The U.S. Fish and Wildlife Service (Service) has reviewed your letter dated August 6, 2007, and its accompanying August 2007 Draft Constellation Programmatic Environmental Impact Statement. The National Aeronautics and Space Administration (NASA) proposes to implement the Constellation Program, a coordinated effort to provide necessary flight systems and Earth-based ground infrastructure at Kennedy Space Center (KSC) in Brevard County, Florida. We provide the following comments in accordance with section 7 of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

Your August 6, 2007, letter requesting comments was received on August 21, 2007. We provide NASA our comments on the effects of the proposed project on the nesting and hatchling loggerhead (*Caretta caretta*), green (*Chelonia mydas*), hawksbill (*Eretmochelys imbricata*), Kemp's ridley (*Lepidochelys kempi*), and leatherback (*Dermochelys coriacea*) sea turtles.

Our concern with the Constellation Program is the effect the lighting associated with this program may have on nesting and hatching sea turtles at KSC. Artificial lighting can be detrimental to sea turtles in several ways. Field observations have shown a correlation between lighted beaches and reduced sea turtle nesting. Adult females rely on visual brightness cues to find their way back to the ocean after nesting, those turtles that nest on lighted beaches may be disoriented by artificial lights and have difficulty finding their way back to the ocean.

Under natural conditions, hatchling sea turtles, which typically emerge from nests at night, move toward the brightest, most open horizon, which is over the ocean. However, when bright light sources are visible on the beach, they become the brightest spot on the horizon and attract hatchlings in the wrong direction, making them more vulnerable to predators, desiccation, entrapment in debris or vegetation, and exhaustion, and often luring them onto roadways and parking lots where they are run over. Artificial lights can also disorient hatchlings once they reach the water.

**Comments from the U.S. Fish and Wildlife Service (cont.):**

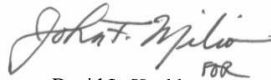
The Service has been working with KSC to finalize a Biological Opinion (BO) for the lights that affect nesting and hatching sea turtles at KSC. Currently KSC has no authorized 'incidental take' for the lights that are affecting nesting and hatching sea turtles.

The Service has determined that the following conditions are necessary to minimize the effects of the Constellation Program on the above federally listed species:

1. A 'Light Management Plan' is implemented for the Constellation Program using the best available sea turtle 'friendly' lighting technology. The Light Management Plan shall be reviewed and approved by the Service.
2. The Service's BO for KSC's facility-wide lighting affects on sea turtles, authorizing incidental take of nesting and hatching sea turtles is completed.

The Service appreciates the cooperation of NASA. We look forward to working with you and your staff regarding the Constellation program. For further coordination please contact Ann Marie Lauritsen at (904) 525-0661.

Sincerely,

A handwritten signature in dark ink, appearing to read "David L. Hankla".

David L. Hankla  
Field Supervisor

Cc: Sandy MacPherson- JAX FO  
Ron Hight- MINWR  
Stephanie Nash- Regional Office- Atlanta

**Response to comments from the U.S. Fish and Wildlife Service:**

Thank you for your comments.

The U.S. Fish and Wildlife Service (USFWS) indicated that the John F. Kennedy Space Center (KSC) needs to have an approved Light Management Plan and completed Biological Opinion from the USFWS for endangered nesting and hatchling sea turtles. The USFWS has issued NASA an interim Biological Opinion, which takes into consideration NASA's operations at the Center, including Space Shuttle launches, and makes a determination as to the “incidental take” that may occur due to those operations.

Per the Endangered Species Act of 1973, anything that negatively impacts the survival of an endangered species is considered a “take.” A “take” includes a disorientation/misorientation or death due to human-caused impacts such as artificial lights. Disorientation may not necessarily cause death, but it does jeopardize the turtle’s ability to successfully make it to the ocean and significantly reduces its survivability due to exhaustion and starvation and increased predation. A “take” does not include natural impacts such as storm events and depredation. “Incidental” means happening just by chance due to human operations. These chance events could include storm events, predation, and other natural conditions that may have influenced the take numbers other than just artificial light.


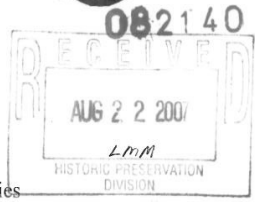


KSC is currently in consultation with the USFWS to finalize this Biological Opinion based on the results of the 2007 nesting season. KSC has conferred with the Jacksonville Office of the Fish and Wildlife Service, Florida and has verbally agreed that there should be a separate Biological Opinion developed for the Constellation Program once the Space Shuttle Program is closed-out. That Biological Opinion will address a specific Light Management Plan for KSC.

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**Final Constellation Programmatic Environmental Impact Statement**

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**Comment from the New Mexico Department of Cultural Affairs:**

<p>National Aeronautics and Space Administration <b>Lyndon B. Johnson Space Center</b> 2101 NASA Parkway Houston, Texas 77058-3696</p>		 <b>082140</b> 
Reply to Attn of:	ZA-07-014	August 6, 2007
TO:	Federal, State and Local Agencies, and Other Interested Parties	
FROM:	ZA/Constellation Program Environmental Manager	
SUBJECT:	Notice of Availability of the Draft Constellation Programmatic Environmental Impact Statement	
<p>In compliance with the NASA policy and procedures (14 CFR Part 1216, subpart 1216.3) for implementing the National Environmental Policy Act, as amended (42 U.S.C. 4321 <i>et seq.</i>), the Draft Constellation Programmatic Environmental Impact Statement is being distributed to Federal, State, and local agencies; interested persons, and organizations, as well as selected repositories. The Draft Constellation Programmatic Environmental Impact Statement is also available in Acrobat® format at: <a href="http://www.nasa.gov/mission_pages/constellation/main/eis.html">http://www.nasa.gov/mission_pages/constellation/main/eis.html</a></p> <p>Any comments on environmental issues related to this Draft Constellation Programmatic Environmental Impact Statement must be submitted by September 30, 2007. Comments may be submitted via e-mail to <a href="mailto:nasa-cxeis@mail.nasa.gov">nasa-cxeis@mail.nasa.gov</a>; by telephone at 1-866-662-7243; or submitted in writing to the following mailing address:</p> <p>ZA/Constellation Program Environmental Manager NASA Lyndon B. Johnson Space Center 2101 NASA Parkway Houston, Texas 77058</p> <p> Jennifer L. Rhatigan, Ph.D., P.E.</p> <p>Enclosure</p>		
		

**Response to comment from the New Mexico Department of Cultural Affairs:**

Thank you for your comment.



**Comments from the New Mexico Environment Department:**



**BILL RICHARDSON**  
GOVERNOR

*State of New Mexico*  
**ENVIRONMENT DEPARTMENT**  
*Office of the Secretary*  
*Harold Runnels Building*  
*1190 St. Francis Drive, P.O. Box 26110*  
*Santa Fe, New Mexico 87502-6110*  
*Telephone (505) 827-2855*



**RON CURRY**  
SECRETARY

**CINDY PADILLA**  
DEPUTY SECRETARY

September 19, 2007

Jennifer L. Rhatigan, Ph.D., P.E.  
ZA/Constellation Program Environmental Manager  
NASA Lyndon B. Johnson Space Center  
2101 NASA Parkway  
Houston, Texas 77058

Dear Dr. Rhatigan:

**RE: DRAFT CONSTELLATION PROGRAMMATIC ENVIRONMENTAL IMPACT  
STATEMENT ( AUGUST 2007)**

This transmits New Mexico Environment Department (NMED) comments concerning the above- referenced Draft Programmatic Environmental Impact Statement (DPEIS).

**SURFACE WATER QUALITY**

These comments apply only to White Sands Missile Range (WSMR)/Johnson Space Center White Sands Test Facility (WSTF) facilities located in New Mexico.

The U.S. Environmental Protection Agency (USEPA) requires National Pollutant Discharge Elimination System (NPDES) Construction General Permit (CGP) coverage for storm water discharges from construction projects (common plans of development) that will result in the disturbance (or re-disturbance) of one or more acres, including expansions, of total land area. It is unclear in the EIS whether construction activities will be part of this proposed action. If construction of one, or a combination of several discrete facilities, exceed one acre (including staging areas, etc.), these construction activities will require appropriate NPDES permit coverage prior to beginning construction (small, one - five acre, construction projects may be able to qualify for a waiver in lieu of permit coverage - see Appendix D).

Among other things, this permit requires that a Storm Water Pollution Prevention Plan (SWPPP) be prepared for the site and that appropriate Best Management Practices (BMPs) be installed and maintained both during and after construction to prevent, to the extent practicable, pollutants (primarily sediment, oil & grease and construction materials

Comments from the New Mexico Environment Department (cont.):

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from construction sites) in storm water runoff from entering waters of the U.S. This permit also requires that permanent stabilization measures (revegetation, paving, etc.), and permanent storm water management measures (storm water detention/retention structures, velocity dissipation devices, etc.) be implemented post construction to minimize, in the long term, pollutants in storm water runoff from entering these waters. In addition, permittees must ensure that there is no increase in sediment yield and flow velocity from the construction site (both during and after construction) compared to pre-construction, undisturbed conditions (see Subpart 9.C.1)

You should also be aware that EPA requires that all "operators" (see Appendix A) obtain NPDES permit coverage for construction projects. Generally, this means that at least two parties will require permit coverage. The owner/developer of this construction project who has operational control over project specifications (probably WSMR in this case), the general contractor(s) who has day-to-day operational control of those activities at the site, which are necessary to ensure compliance with the storm water pollution plan and other permit conditions, and possibly other "operators" will require appropriate NPDES permit coverage for this project.

The CGP was re-issued effective July 1, 2003 (see **Federal Register/Vol. 68, No. 126/Tuesday, July 1, 2003** pg. 39087). The CGP, Notice of Intent (NOI), Fact Sheet, and Federal Register notice can be downloaded at:  
<http://cfpub.epa.gov/npdes/stormwater/cgp.cfm>

In addition, operation of these types of facilities may require Storm Water Multi-sector General Permit (see **Federal Register/Vol. 65, No. 210/Monday, October 30, 2000**) coverage. Impact areas, fueling and material handling areas, soil remediation activities, equipment manufacturing, etc. likely qualify as potential sources of pollution which may reasonably be expected to affect the quality of storm water discharges from activities that meet the USEPA definition of "industrial activities," under several possible sectors. This permit also requires preparation of a SWPPP, and installation of appropriate storm water runoff control practices (per the SWPPP).

An industrial SWPPP should include such things as:

- **A description of potential pollutant sources** - includes such things as a site map, an identification of the types of pollutants that are likely to be present in storm water discharges, an inventory of the types of materials handled at the site that potentially may be exposed to precipitation, a list of significant spills and leaks of toxic or hazardous pollutants, sampling data, a narrative description of the potential pollutant sources from specific activities at the facility, and identification of specific potential pollutants; and
- **A description of appropriate measures and controls** - includes the type and location of existing and proposed non-structural and structural best management practices (BMPs) selected for each of the areas where industrial materials or activities are exposed to storm water. Non-structural and structural BMPs to be described and implemented include such things as good housekeeping, preventive maintenance, spill prevention and response procedures, periodic inspections, employee training, record keeping, non-storm water evaluations and certifications,

**Comments from the New Mexico Environment Department (cont.):**

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sediment and erosion control, as well as implementation/maintenance of traditional storm water management practices where appropriate, and a reclamation plan.

WSMR already has NPDES Storm Water Multi-sector General Permit coverage (NMR05A057) for various other industrial activities at this facility. The permittee should amend the existing Storm Water Pollution Prevention Plan to incorporate any additional activities and pollutant controls dictated by this proposed action.

*AIR QUALITY*

Aluminum oxide (Al<sub>2</sub>O<sub>3</sub>) is listed under 20.2.72.502 NMAC – Toxic Air Pollutants and Emissions, Table A-Noncarcinogens. To ensure compliance with the State of New Mexico's air quality regulations, modeling may need to be conducted to show that the eight-hour average ambient concentration of the toxic air pollutant Al<sub>2</sub>O<sub>3</sub> does not exceed one-one hundredth of the occupational exposure limit (OEL) and that the required air toxics emission limits listed under Section 502, Table A are not exceeded. If the OEL and/or the emissions limits exceed what is listed under Section 502, Table A, then an air quality permit must be obtained from the Department's Air Quality Bureau (AQB). For more information on the permitting and modeling requirements for toxic air pollutants, please refer to 20.2.72.400 NMAC.

White Sands Missile Range (WSMR) extends into parts of several New Mexico counties, including Doña Ana County. The White Sands Test Facility (WSTF), which is within the boundaries of WSMR, is located entirely in Doña Ana County. All of the counties are considered in attainment with New Mexico and National Ambient Air Quality Standards; however, the AQB has recorded exceedances of the standard for particulate matter (PM<sub>10</sub>) in Doña Ana County. In response to the recorded exceedances of the standard for PM<sub>10</sub>, a Natural Events Action Plan (NEAP) has been developed for wind blown dust in Doña Ana County. As part of the NEAP, White Sands Missile Range signed a memorandum of agreement (MOA) with the New Mexico Environment Department in support of the NEAP. This MOA needs to be referenced in the PEIS for this project if any portion of the project area is located in Doña Ana County. The NEAP may be downloaded from our web page at <http://www.nmenv.state.nm.us/aqb/NEAP/index.html>. Doña Ana County has adopted an ordinance for dust control (Doña Ana County Ordinance No. 194-2000, Erosion Control Regulations). Compliance with this ordinance may be required.

Areas disturbed by project activities, within and adjacent to the project area, should be reclaimed to avoid long-term problems with erosion and fugitive dust. During the construction activities, dust control measures should be taken to minimize the release of particulates. Long-term dust control can be achieved by paving, revegetating, or using dust suppressants on disturbed areas following construction.

All asphalt, concrete, quarrying, crushing, and screening facilities contracted in conjunction with the proposed project must have current and proper air quality permits. For more information on air quality permitting and modeling requirements, please refer to 20.2.72 NMAC.

**Comments from the New Mexico Environment Department (cont.):**

Jennifer L. Rhatigan  
September 19, 2007  
Page 4

The project as proposed should have no long-term significant impacts to ambient air quality.

*HAZARDOUS WASTE*

We would like to emphasize a number of items concerning hazardous waste relative to this project::

- If test articles impact on-site, WSMR is exempt from the Resource Conservation and Recovery Act (RCRA). However, if WSMR manages the crash sites and contaminated soil, as required by their Stewardship program, then WSMR's remediation and recovery efforts may be subject to RCRA Subtitle C and/or D. Management of contaminated media and newly created waste associated with crash debris and contaminated soil is potentially subject to RCRA.
- NASA states in Section 4.1.1.9.1 (Land Resources) that in all cases, the test articles would land within WSMR. If a test weapon crashes off-site, then WSMR is subject to the Military Munitions Rule (see Subpart M to 40 CFR 266). This scenario is not addressed in the EIS.
- NASA states in Section 3.1.9.9 (Hazardous Materials and Waste) of the EIS that White Sands Missile Range (WSMR) is regulated both for generation and for treatment and storage of hazardous wastes, for which it holds a RCRA Part B Permit. WSMR's 1989 and future (currently in draft) RCRA operating permits are for storage only; therefore, treatment of hazardous waste is prohibited.
- NASA must ensure that all off-specification, unused and unburned fuels, propellants, and oxidizers are properly managed.

We appreciate the opportunity to comment on this document. Please let us know if you have any questions.

Sincerely,

  
Ron Curry  
Secretary

NMED File No. 2523ER

**Response to comments from the New Mexico Environment Department:**

Thank you for your comments.

**NASA General Response:** The NASA Launch Abort System (LAS) testing proposed for the U.S. Army's White Sands Missile Range (WSMR) has also been evaluated separately from the *Draft Constellation Programmatic Environmental Impact Statement* (Draft PEIS). This separate evaluation included preparation of an Environmental Assessment (EA), entitled the *Final Environmental Assessment for NASA Launch Abort System (LAS) Test Program, NASA Johnson Space Center White Sands Test Facility, Las Cruces, New Mexico*. This separate EA was required due to schedule constraints relating to completing facility design activities in a timely manner to meet important test program milestones and allow construction activities to commence. This EA discusses many of the issues in the New Mexico Environmental Department (NMED) comments provided to NASA by letter dated September 19, 2007. This EA was completed in late July 2007 and was issued for a 30-day public comment period on August 5, 2007. The public comment period closed on September 5, 2007. There were no comments received and a Finding of No Significant Impact (FONSI) was prepared. A copy of the EA on a compact disk (CD) was sent to the NMED point of contact for NASA activities on August 3, 2007. A copy of the EA can be obtained by contacting Tim Davis at NASA's Johnson Space Center White Sands Test Facility (WSTF) via telephone at (575) 524-5024 or electronic mail (e-mail) at [timothy.j.davis@nasa.gov](mailto:timothy.j.davis@nasa.gov). The EA is also available in electronic format at: [www.nasa.gov/mission\\_pages/constellation/main/wsmr\\_las\\_ea.html](http://www.nasa.gov/mission_pages/constellation/main/wsmr_las_ea.html).

**Specific Responses to Surface Water and Storm Water Comments**

**NMED Comment:** It is unclear in the EIS whether construction activities will be part of this proposed action. If construction of one, or a combination of several discrete facilities, exceed one acre (including staging areas, etc.), these construction activities will require appropriate NPDES permit coverage prior to beginning construction (small, one-five acre, construction projects may be able to qualify for a waiver in lieu of permit coverage – see Appendix D).

**NASA Response:** The Proposed Action will include numerous construction activities. As described in the LAS EA, Sections 1.4.2.1 through 1.4.2.8, this project will include a final integration and test facility, storage areas, launch facilities, a launch pad area, a launch gantry, an umbilical tower, a launch services pad with blast barrier, and possibly some relatively minor additional road work. Based on standard WSMR environmental compliance procedures and normal construction practices for contractors at a Federal facility, all appropriate National Pollutant Discharge Elimination System (NPDES) permit coverage, including storm water for small construction activities, will be evaluated and obtained as required by regulations.

**NMED Comment:** WSMR already has NPDES Storm Water Multi-sector General Permit coverage (NMR05A057) for various other industrial activities at this facility. The permittee should amend the existing Storm Water Pollution Prevention Plan to incorporate any additional activities and pollutant controls dictated by this proposed action.



**Response to the Comment Letter from the New Mexico Environment Department (cont.):**

**NASA Response:** NPDES evaluation of new and proposed projects at WSMR is a routine activity performed by the WSMR Environmental Directorate. As dictated by standard WSMR environmental compliance procedures, the current NPDES Storm Water Multi-Sector General Permit coverage will be amended as applicable for additional activities and pollutant controls.

**Specific Responses to Air Quality Comments**

**NMED Comment:** To ensure compliance with the State of New Mexico's air quality regulations, modeling may need to be conducted to show that the eight-hour average ambient concentration of the toxic air pollutant  $\text{Al}_2\text{O}_3$  does not exceed one-one hundredth of the occupational exposure limit (OEL) and that the required air toxics emission limits listed under Section 502, Table A are not exceeded. If the OEL and/or the emissions limits exceed what is listed under Section 502, Table A, then an air quality permit must be obtained from the Department's Air Quality Bureau (aqb).

**NASA Response:** The LAS EA discusses the various propellants and potential air emissions in Sections 1.3.2, 1.4.2.9, 3.2.5, and 4.2.5. As specified by both WSMR and NASA standard environmental compliance procedures, evaluations of propellants and emissions will ensure compliance with regulatory requirements including air toxic permitting requirements for aluminum oxide, if necessary. Any modeling and permit preparation tasks required by this project will be performed by personnel with the WSMR Environmental Directorate.

**NMED Comment:** In response to the recorded exceedances of the standard for  $\text{PM}_{10}$ , a Natural Events Action Plan (NEAP) has been developed for wind blown dust in Dona Ana County. As part of the NEAP, White Sands Missile Range signed a Memorandum of agreement (MOA) with the New Mexico Environment Department in support of the NEAP. This MOA needs to be referenced in the PEIS for this project if any portion of the project area is located in Dona Ana County. The NEAP may be downloaded from our web page at <http://www.nmenv.state.nm.us/aqb/NEAP/index.html>. Dona Ana County has adopted an ordinance for dust control (Dona Ana County Ordinance No. 194-2000, Erosion Control Regulations). Compliance with this ordinance may be required.

**NASA Response:** The proposed construction site at Launch Complex (LC)-32 is located within Doña Ana County. The MOA with NMED has been referenced in the Final PEIS. In the LAS EA, air quality issues are also discussed in Sections 3.2.5 and 4.2.5. Mitigation measures including dust suppression activities such as utilization of water tankers are briefly discussed in the EA in Section 5.2. Section 3.1.9.2.2 of the Final PEIS has been modified by adding the following sentence at the end of the second paragraph: "...exceedances of  $\text{PM}_{10}$  due to wind-blown dust have been recorded in Doña Ana County. In response to these exceedances, a Natural Events Action Plan has been developed for wind blown dust in Doña Ana County. As part of the Natural Events Action Plan, WSMR signed a Memorandum of Agreement with the New Mexico Environment Department in support of the Natural Events Action Plan."

**Response to the comment from the New Mexico Environment Department (cont.):**

**NMED Comment:** Areas disturbed by project activities, within and adjacent to the project area, should be reclaimed to avoid long-term problems with erosion and fugitive dust. During the construction activities, dust control measures should be taken to minimize the release of particulates. Long-term dust control can be achieved by paving, revegetating, or using dust suppressants on disturbed area following construction.

**NASA Response:** The LAS EA discusses air quality issues including dust control in Sections 3.2.5, 4.2.5, and 5.2. Additionally, revegetation is briefly discussed in Section 4.3.1. In summary, the EA discusses mitigation measures for dust control including dust suppressants such as using water tanks and minimizing ground disturbance when possible. In the event that up-range landing zones require mitigation measures, Sections 4.2.4 and 4.2.6 in the LAS EA discuss the evaluation of corrective measures in cooperation with the regulatory agencies. For example, Contingency Plans will be developed to address any up-range issues due to landing zones or launch accidents and follow-up Work Plans will be generated with input, and approval, from the appropriate regulatory agencies.

**NMED Comment:** All asphalt, concrete, quarrying, crushing, and screening facilities contracted in conjunction with the proposed project must have current and proper air quality permits.

**NASA Response:** Based on standard WSMR and NASA operational procedures and environmental compliance requirements, including procurement regulations for obtaining contractor services at a Federal facility, any asphalt, concrete, quarrying, crushing, and screening facilities will have current and proper air quality permits.

**NMED Comment:** The project should have no long-term significant impacts to ambient air quality.

**NASA Response:** NASA concurs with this NMED comment. The project will not have any long-term significant impacts to ambient air quality. The LAS EA documentation describes air quality issues at Sections 3.2.5 and 4.2.5. Additionally, mitigation measures for dust suppression are briefly discussed in Section 5.2.

**Specific Responses to Hazardous Waste Comments**

**NMED Comment:** If test articles impact on-site, WSMR is exempt from the Resource Conservation and Recovery Act (RCRA). However, if WSMR manages the crash sites and contaminated soil, as required by their Stewardship program, then WSMR's remediation and recovery efforts may be subject to RCRA Subtitle C and/or D. Management of contaminated media and newly created waste associated with crash debris and contaminated soil is potentially subject to RCRA.

**NASA Response:** WSMR will comply with all applicable rules and regulations, including the RCRA Subtitle C and/or D programs where applicable. In the LAS EA, the potential for managing crash sites and contaminated soils is briefly described in Sections 4.2.4 and 4.2.6. To summarize the LAS EA, a Contingency Plan will be developed that documents standard procedures for emergency response and spill response due to a launch accident. This Contingency Plan will delineate specific actions for immediate response procedures to minimize

**Response to comments from the New Mexico Environment Department (cont.):**

contamination, notify regulatory agencies, and develop final corrective action strategies with associated Agency-approved documentation (*e.g.*, Work Plans). All corrective action activities will be performed in compliance with all state and Federal regulatory requirements.

**NMED Comment:** NASA states in Section 4.1.1.9.1 (Land Resources) that in all cases, the test articles would land within WSMR. If a test weapon crashes off-site, then WSMR is subject to the Military Munitions Rule (see Subpart M to 40 CFR 266). This scenario is not addressed in the EIS.

**NASA Response:** This scenario is not discussed in the PEIS, or the LAS EA, because an off-range launch accident from the LAS test activities is not considered a scenario that is reasonably expected to occur. As such, it is not discussed in any of the NEPA documentation. However, the EA discusses human health and safety in Sections 3.9 and 4.9. These discussions of human health and safety provisions include the possibility of utilizing flight termination procedures to preclude an offsite launch accident (Section 5.6 of the EA discussing mitigation measures). In the extremely unlikely event that a test article goes severely off-target and lands off-range, the LAS Test Program would comply with all applicable NASA and WSMR procedures as well as all state and Federal rules and regulations.

**NMED Comment:** NASA states in Section 3.1.9.9 (Hazardous Materials and Waste) of the EIS that White Sands Missile Range (WSMR) is regulated both for generation and for treatment and storage of hazardous wastes, for which it holds a RCRA Part B Permit. WSMR's 1989 and future (currently in draft) RCRA operating permits are for storage only; therefore, treatment of hazardous waste is prohibited.

**NASA Response:** The LAS testing activities at WSMR will not require any treatment of hazardous waste. It is expected that the project will generate only relatively small quantities of hazardous waste which will require accumulation in satellite areas and eventual storage of hazardous waste in a RCRA permitted storage area prior to shipment for off-site disposal. All generation and storage procedures will meet the current, and future, requirements of the RCRA Part B permit. WSMR has historically been called a RCRA Treatment, Storage, and Disposal Facility (TSDF). This is standard RCRA terminology, even though facilities may not have permits for certain portions of possible RCRA regulated activities. For example, WSMR is a permitted storage facility, not a permitted disposal or treatment facility and the White Sands Test Facility (WSTF) is a permitted treatment and storage facility, but not a disposal facility. However, both WSMR and WSTF are routinely described by the regulatory agencies as a TSDF and it is likely that this terminology is where the Draft PEIS language discussing potential treatment was obtained. Regardless, the project does not anticipate any hazardous waste treatment requirements and will not require any hazardous waste operations that are not allowed by the current, and future, RCRA Part B permit. The language regarding treatment of hazardous waste in the Draft PEIS has been removed to preclude any need for clarification on the RCRA provisions. Section 3.1.9.9 of the Final PEIS currently states, "WSMR is regulated both for generation and storage of hazardous wastes, for which it holds a RCRA Part B permit."



**Response to comments from the New Mexico Environment Department (cont.):**

**NMED Comment:** NASA must ensure that all off-specification, unused and unburned fuels, propellants, and oxidizers are properly managed.

**NASA Response:** NASA addressed these issues in several areas in the EA. The management of hazardous waste, hazardous materials, and solid waste is discussed in Sections 1.4.2.9, 3.8, and 4.8 of the EA. Additionally, a brief discussion of mitigation activities is also discussed in Section 5.5 of the EA. To summarize the EA, hazardous waste will be managed using standard WSMR Procedures. These procedures provides guidelines for the handling and management of hazardous waste and facilitates compliance with all Federal, state, and local laws regulating the generation, handling, treatment, storage, and disposal of hazardous waste. For hazardous materials, the EA states that unused materials will be recovered, transported, properly managed, and stored in accordance with WSMR procedures and all state and Federal regulations. For solid waste, the EA states that an offsite contractor will collect the waste and transport for disposal at the local landfill.

**Comment from the Maryland Department of the Environment:**



**MARYLAND DEPARTMENT OF THE ENVIRONMENT**

1800 Washington Boulevard • Baltimore, Maryland 21230  
410-537-3000 • 1-800-633-6101 • <http://www.mde.state.md.us>

Martin O'Malley  
Governor

Shari T. Wilson  
Secretary

Anthony G. Brown  
Lieutenant Governor

Robert M. Summers, Ph.D.  
Deputy Secretary

September 24, 2007

Ms. Jennifer L. Rhatigan  
NASA Lyndon B. Johnson Space Center  
2101 NASA Parkway  
Houston, TX 77058

RE: State Application Identifier: MD20070821-0904  
Project: Draft Constellation Programmatic Environmental Impact Statement

Dear Ms. Rhatigan:

Thank you for providing the Maryland Department of the Environment (MDE) with the opportunity to comment on the above-referenced project. Copies of the documents were circulated throughout MDE for review, and it has been determined that this project is consistent with MDE's plans, programs and objectives.

Again, thank you for giving MDE the opportunity to review this project. If you have any questions or need additional information, please feel free to call me at (410) 537-4120.

Sincerely,

A handwritten signature in dark ink, appearing to read 'Joane D. Mueller', is written over a light blue horizontal line.

Joane D. Mueller  
MDE Clearinghouse Coordinator  
Science Services Administration


cc: Bob Rosenbush, State Clearinghouse

**Response to comment from the Maryland Department of the Environment:**

Thank you for your comment.

## Final Constellation Programmatic Environmental Impact Statement

### Comment from the Maryland Department of Planning:

  
**Maryland Department of Planning**

*Martin O'Malley*  
Governor

*Anthony G. Brown*  
Lt. Governor

*Richard Eberhart Hall*  
Secretary

*Matthew J. Power*  
Deputy Secretary

August 23, 2007

Ms. Jennifer L. Rhatigan, Ph.D.  
ZA/Constellation Program Environmental Manager  
National Aeronautics and Space Administration  
NASA Lyndon B. Johnson Space Center  
2101 NASA Parkway  
Houston, TX 77058

**STATE CLEARINGHOUSE REVIEW PROCESS**  
**State Application Identifier:** MD20070821-0904  
**Reviewer Comments Due By:** September 27, 2007  
**Project Description:** Draft Constellation Programmatic Environment Impact Statement: develop flight systems and Earth-based ground infrastructure for access to space and assistance for future crewed missions  
**Project Location:** States of Alabama, California, Florida, Louisiana, Mississippi, New Mexico, Ohio, Texas, Utah and Virginia; Prince George's County  
**Clearinghouse Contact:** Bob Rosenbush


Dear Ms. Rhatigan:

Thank you for submitting your project for intergovernmental review. Participation in the Maryland Intergovernmental Review and Coordination (MIRC) process helps ensure project consistency with plans, programs, and objectives of State agencies and local governments. MIRC enhances opportunities for approval and/or funding and minimizes delays by resolving issues before project implementation.

The following agencies and/or jurisdictions have been forwarded a copy of your project for their review: the Maryland Departments of Natural Resources, the Environment, Transportation, the County of Prince George's, and the Maryland Department of Planning, including the Maryland Historical Trust. They have been requested to contact your agency directly by **September 27, 2007** with any comments or concerns and to provide a copy of those comments to the State Clearinghouse for Intergovernmental Assistance. Please be assured that after **September 27, 2007** all MIRC requirements will have been met in accordance with Code of Maryland Regulations (COMAR 14.24.04). The project has been assigned a unique State Application Identifier that should be used on all documents and correspondence.

If you need assistance or have questions, contact the State Clearinghouse staff noted above at 410-767-4490 or through e-mail at [brosenbush@mdp.state.md.us](mailto:brosenbush@mdp.state.md.us). Thank you for your cooperation with the MIRC process.

Sincerely,

  
Linda C. Janey, J.D., Assistant Secretary  
for Clearinghouse and Communications

LCJ:BR  
Enclosures  
cc: Beth Cole – MHIT\*  
Steve Allan – MDPL\*  
Ray Dintaman – DNR\*  
Joane Mueller – MDE\*

Cindy Johnson – MDOT\*  
Beverly Warfield – PGEO\*

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### Response to comment from the Maryland Department of Planning:

Thank you.

**Comments from the Virginia Office of Environmental Impact Review:**



*COMMONWEALTH of VIRGINIA*

*DEPARTMENT OF ENVIRONMENTAL QUALITY*  
*Street address: 629 East Main Street, Richmond, Virginia 23219*  
*Mailing address: P.O. Box 1105, Richmond, Virginia 23218*  
*Fax (804) 698-4500 TDD (804) 698-4021*  
*www.deq.virginia.gov*

L. Preston Bryant, Jr.  
Secretary of Natural Resources

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

September 25, 2007

ZA/Constellation Program Environmental Manager  
NASA Lyndon B. Johnson Space Center  
2101 NASA Parkway  
Houston, Texas 77058

RE: Draft Constellation Programmatic Environmental Impact Statement, Langley  
Research Center, City of Hampton, Virginia (DEQ 07-143F).

Dear ZA/Constellation Program Environmental Manager:

The Commonwealth of Virginia has completed its review of the August 6, 2007 Draft Environmental Impact Statement (DEIS) (received August 20, 2007) for the above referenced project. The Department of Environmental Quality is responsible for coordinating Virginia's review of federal environmental documents and responding to appropriate federal officials on behalf of the Commonwealth. The following agencies and planning district commission participated in the review of this proposal:

Department of Environmental Quality  
Hampton Roads Planning District Commission

The Department of Historic Resources and the City of Hampton were also invited to comment.

**Project Description**

The National Aeronautics and Space Administration (NASA) has submitted a Draft Programmatic Environmental Impact Statement (DPEIS) for the Constellation Program. NASA proposes to implement the Constellation Program to develop a new class of exploration vehicles and the infrastructure necessary to support their development and use in space exploration. The purpose of NASA's Proposed Action is to undertake the activities necessary to develop the flight systems and ground infrastructure required to enable continued access to space and to enable future crewed missions to the International Space Station, the Moon, Mars, and beyond. The Constellation Program consists of six projects:

**Comments from the Virginia Office of Environmental Impact Review (cont.):**

Page 2

1. Project Orion (develop and test the Orion spacecraft);
2. Project Ares (develop and test the Aries I and Ares V launch vehicles);
3. Ground Operations Project (logistics and launch services);
4. Mission Operations Project (crew, flight controllers, and support staff training);
5. Lunar Lander Project (develop and test lunar lander); and
6. Extravehicular Activities (EVA) Project (provide space suits and tools).

In Virginia, NASA proposes to utilize the Langley Research Center (LARC) in the City of Hampton to manage the Orion Launch Abort System development, the Orion landing system development and testing, and Ares ascent development flight test vehicle integration. According to the DPEIS, most of the reasonably foreseeable activities would be similar to ongoing activities conducted in support of NASA programs. Most of the modifications anticipated would be relatively minor such as internal upgrades to test equipment and components. Except for modifications of existing buildings, no new construction or building expansion is proposed at LaRC.

**Environmental Program Guidance**

According to the DPEIS anticipated activities proposed for the NASA Langley Research Center in Hampton would be minor internal upgrades to equipment and not involve the construction of new facilities or the expansion of existing facilities. Therefore, the Virginia natural resource agencies that reviewed the document do not anticipate significant project impacts to programs under their jurisdiction. However, should the proposed action change and significant impacts are identified, compliance with one or more programs may be required. The following is provided as guidance on environmental programs that could be impacted by future unforeseen actions related to the Constellation Program.

**1. Water Quality & Wetlands.** In Virginia, water quality and wetland impacts are regulated through Federal and State government programs. Point source pollution control is administered by DEQ pursuant to Virginia Code 62.1-44.15, and is accomplished through the implementation of:

- The National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.
- The Virginia Water Protection Permit (VWPP) program administered by DEQ (Virginia Code §62.1-44.15:5) and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

Comments from the Virginia Office of Environmental Impact Review (cont.):

Page 3

Wetlands management is accomplished through:

- The tidal wetlands program is administered by the Virginia Marine Resources Commission (VMRC) (Virginia Code 28.2-1301 through 28.2-1320).
- The Virginia Water Protection Permit (VWPP) program administered by DEQ, which includes protection of both tidal and non-tidal wetlands (Virginia Code §62.1-44.15:5), and Water Quality Certification pursuant to Section 401 of the Clean Water Act.

Please note that the Commonwealth does not support the filling of wetlands, particularly when alternative sites have been identified. It is the policy of the Commonwealth of Virginia to first avoid impacts to wetlands before considering other mitigation measures such as minimization and compensation. The Virginia Water Protection Permit regulations state that "mitigation means sequentially avoiding and minimizing impacts to the extent practicable, and then compensating for remaining unavoidable impacts of a proposed action" (9 VAC 25-210-10). According to State Water Control Law § 62.1-44.15:5D, "...except in compliance with an individual or general Virginia Water Protection Permit issued in accordance with this subsection, it shall also be unlawful to conduct the following activities in a wetland: (i) new activities to cause draining that significantly alters or degrades existing wetland acreage or functions, (ii) filling or dumping, (iii) permanent flooding or impounding, or (iv) new activities that cause significant alteration or degradation of existing wetland acreage or functions. Permits shall address avoidance and minimization of wetland impacts to the maximum extent practicable. A permit shall be issued only if the Board finds that the effect of the impact, together with other existing or proposed impacts to wetlands, will not cause or contribute to a significant impairment of state waters or fish and wildlife resources."

Furthermore, Federal wetlands mitigation policy is guided by a Memorandum of Agreement between the U.S. Army Corps of Engineers (Corps) and the U.S. Environmental Protection Agency that clarify a three-step approach to avoiding, minimizing, and compensating for unavoidable impacts (see Clean Water Act Section 404 (b)(1) *Guidelines Mitigation Memorandum of Agreement*, February 1990). The Corps first makes a determination that potential impacts have been avoided to the maximum extent practicable; remaining unavoidable impacts will then be mitigated to the extent appropriate and practicable by requiring steps to minimize impacts and, finally, compensate for aquatic resource values. This sequence is considered satisfied where the proposed mitigation is in accordance with specific provisions of a Corps and EPA approved comprehensive plan that ensures compliance with the compensation requirements of the 404(b)(1) Guidelines (examples of such comprehensive plans may include Special Area Management Plans, Advance Identification areas (Section 230.80), and State Coastal Zone Management Plans).

In general, DEQ recommends that the amount of stream and wetland impacts be avoided to the maximum extent practicable. For unavoidable impacts, DEQ



**Comments from the Virginia Office of Environmental Impact Review (cont.):**

Page 4

encourages the following practices to minimize the impacts to wetlands and waterways:

- operation of machinery and construction vehicles outside of stream-beds and wetlands;
- use of synthetic mats when in-stream work is unavoidable;
- stockpiling of material excavated from the trench for replacement if directional drilling is not feasible; and
- preservation of the top 12 inches of trench material removed from wetlands for use as wetland seed and root stock in the excavated area.

For any future development related to the proposed project with potential water quality or wetland impacts, contact VMRC at (757) 247-2200 for a JPA.

**2. Subaqueous Lands Impacts.** The Virginia Marine Resources Commission (VMRC), pursuant to Chapter 12 of Title 28.2 of the Code of Virginia, is responsible for issuing permits for encroachments in, on, or over State-owned submerged lands throughout the Commonwealth. Accordingly, if any portion of future development projects involves any encroachments channelward of ordinary high water along natural rivers and streams, a permit may be required from VMRC.

The Virginia Marine Resources Commission serves as the clearinghouse for the Joint Permit Application (JPA) used by the:

- U.S. Army Corps of Engineers (Corps) for issuing permits pursuant to Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act;
- DEQ for issuance of a Virginia Water Protection Permit;
- VMRC for encroachments on or over state-owned subaqueous beds as well as tidal wetlands; and
- local wetlands board for impacts to wetlands.

For any future development related to the proposed project with potential impacts to subaqueous lands, water quality, or wetland impacts, contact VMRC at (757) 247-2200 for a JPA. VMRC will distribute the application to the appropriate agencies. Each agency will conduct its review and respond.

**3. Erosion and Sediment Control and Stormwater Management.** According to available guidance from the Department of Conservation and Recreation's (DCR's) Division of Soil and Water Conservation (DSWC), federal agencies and their authorized agents conducting regulated land disturbing activities on private and public lands in the state must comply with the Virginia Erosion and Sediment Control Law and Regulations (VESCL&R), Virginia Stormwater Management Law and Regulations (VSWML&R), and other applicable federal nonpoint source pollution mandates (e.g. Clean Water Act Section 313, Federal Consistency under the Coastal Zone Management Act). Clearing

Comments from the Virginia Office of Environmental Impact Review (cont.):

Page 5

and grading activities, installation of staging areas, parking lots, roads, buildings, utilities, or other structures, soil/dredge spoil areas, or related land conversion activities that disturb 2,500 square feet or more in Chesapeake Bay Preservation Areas would be regulated by VESCL&R and those that disturb one acre or greater would be covered by VSWML&R. Accordingly, NASA should prepare and implement erosion and sediment control (ESC) and stormwater management (SWM) plans to ensure compliance with state law. NASA is ultimately responsible for achieving project compliance through oversight of on-site contractors, regular field inspection, prompt action against non-compliant sites, and/or other mechanisms, consistent with agency policy.

Furthermore, DCR is responsible for the issuance, denial, revocation, termination and enforcement of Virginia Pollutant Discharge Elimination System (VPDES) permits for the control of stormwater discharges from municipal separate storm sewer systems (MS4s) and land disturbing activities under the Virginia Stormwater Management Program. Therefore, for projects involving land disturbing activities of 2,500 square feet or more, the property owner/authorized agent is required to apply for registration coverage under the General Permit for Discharges of Stormwater from Construction Activities. General information and registration forms for the General Permit are available on DCR's website at: <http://www.dcr.virginia.gov/sw/vsmp.htm#geninfo>.

**4. Chesapeake Bay Preservation Areas.** According to available guidance from DCR's Division of Chesapeake Bay Local Assistance (DCBLA), while Chesapeake Bay Preservation Areas are not locally designated on federal lands, NASA must ensure any future development is consistent with the provisions of the *Chesapeake Bay Preservation Area Designation and Management Regulations*, (Regulations) § 9 VAC 10-20-10 *et seq.*, as one of the enforceable policies of Virginia's Coastal Resources Management Program (VCP). In accordance with the Federal consistency requirements of the Coastal Zone Management Act (CZMA), Federal actions on installations located within Tidewater Virginia are required to be consistent with the performance criteria of the Regulations on lands analogous to locally designated Chesapeake Bay Preservation Areas.

The Chesapeake Bay Preservation Act along with the Chesapeake Bay Preservation Area Designation and Management Regulations (Regulations) (§9 VAC 10-20-110), as locally implemented by the City of Hampton, strictly controls land disturbance in:

- tidal wetlands;
- non-tidal wetlands connected by surface flow and contiguous to tidal wetlands or perennial water bodies;
- tidal shores;
- highly erodible soils; and
- within a 100-foot vegetated buffer area located adjacent to and landward of the aforementioned features and along both sides of any water body with perennial flow that are within the Chesapeake Bay watershed (i.e. Resource Protection Areas or RPAs).



**Comments from the Virginia Office of Environmental Impact Review (cont.):**

Page 6

The area 100 feet landward of RPAs (i.e. Resource Management Areas or RMAs) is subject to the City of Hampton's less stringent performance criteria. The performance criteria for RMAs include:

- minimizing land disturbance;
- preserving indigenous vegetation;
- minimizing impervious surfaces;
- controlling stormwater runoff quality; and
- developing erosion and sediment control plans for land disturbances greater than 2,500 square feet.

Prior to construction of any future projects, an individual site plan, description and consistency analysis for each project must be submitted to DEQ for consistency review under the federal Coastal Zone Management Act (CZMA). A consistency determination must be conducted for each project. For further information, contact Alice Baird, DCR-DCBLA at (804) 225-2307.

**5. Air Pollution Control.** Please note that the LaRC is located in the Hampton Roads ozone (O<sub>3</sub>) maintenance area and an emission control area for the contributors to ozone pollution, which are volatile organic compounds (VOCs) and oxides of nitrogen (NO<sub>x</sub>). This has two practical consequences for any future development or expansion of the facility. One is that the NASA should take all reasonable precautions to limit emissions of VOCs and NO<sub>x</sub>, principally by controlling or limiting the burning of fossil fuels. A second precaution, stemming from 9 VAC 5-40-5490 in the Regulations for the Control and Abatement of Air Pollution, is that there are some limitations on the use of "cut-back" (liquefied asphalt cement, blended with petroleum solvents) that may apply in the construction of roads and parking areas associated with the project. The asphalt must be "emulsified" (predominantly cement and water with a small amount of emulsifying agent) except when specified circumstances apply. Moreover, there are time-of-year restrictions on its use during the months of April through October in VOC emission control areas.

During construction, fugitive dust must be kept to a minimum by using control methods outlined in 9 VAC 5-50-60 et seq. of the Regulations for the Control and Abatement of Air Pollution. These precautions include, but are not limited to, the following:

- Use, where possible, of water or chemicals for dust control;
- Installation and use of hoods, fans, and fabric filters to enclose and vent the handling of dusty materials;
- Covering of open equipment for conveying materials; and
- Prompt removal of spilled or tracked dirt or other materials from paved streets and removal of dried sediments resulting from soil erosion.

Comments from the Virginia Office of Environmental Impact Review (cont.):

Page 7

If project activities include the burning of construction or demolition material, this activity must meet the requirements under 9 VAC 5-40-5600 et seq. of the Regulations for open burning, and it may require a permit. The Regulations provide for, but do not require, the local adoption of a model ordinance concerning open burning. NASA should contact the City of Hampton officials to determine what local requirements, if any, exist.

**6. Solid and Hazardous Wastes and Hazardous Materials.** Any soil that is suspected of contamination or wastes that are generated for any future development must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable State laws and regulations are:

- Virginia Waste Management Act (Code of Virginia Section 10.1-1400 et seq.);
- Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60);
- Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-80); and
- Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110).

Some of the applicable Federal laws and regulations are:

- the Resource Conservation and Recovery Act (RCRA) (42 U.S.C. Section 6901 et seq. and the applicable regulations contained in Title 40 of the Code of Federal Regulations); and
- the U.S. Department of Transportation Rules for Transportation of Hazardous materials (49 CFR Part 107).

Also, any structures that are to be demolished, renovated, or removed should be checked for asbestos-containing materials (ACM) and lead-based paint prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-80-640 for ACM and 9VAC 20-60-261 for LBP must be followed.

- *Asbestos Materials.* It is the responsibility of the owner or operator of a renovation or demolition activity, prior to the commencement of the renovation or demolition, to thoroughly inspect the affected part of the facility where the operation will occur for the presence of asbestos, including Category I and Category II nonfriable asbestos containing material (ACM). Upon classification as friable or non-friable, all waste ACM shall be disposed of in accordance with the Virginia Solid Waste Management Regulations (9 VAC 20-80-640), and transported in accordance with the Virginia regulations governing Transportation of Hazardous Materials (9 VAC 20-110-10 et seq.). Contact the DEQ Waste Management Program for additional information, (804) 698-4021, and the Department of Labor and Industry, Ronald L. Graham at (804) 371-0444.

Comments from the Virginia Office of Environmental Impact Review (cont.):

Page 8

- **Lead-Based Paint.** If applicable, the proposed project must comply with the U.S. Department of Labor, Occupational Safety and Health Administration (OSHA) regulations, and with the Virginia Lead-Based Paint Activities Rules and Regulations. For additional information regarding these requirements contact the Department of Professional and Occupational Regulation, David Dick at (804) 367-8588.

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately. For more information contact Paul Kohler, DEQ Waste Division, at (804) 698-4208.

**7. Petroleum Storage Tanks.** The NASA Langley Research Center (CEDS Facility # 5001411) currently operates 5 regulated underground storage tanks (USTs) and 9 regulated aboveground storage tanks (ASTs) for the storage and dispensing of various petroleum products including gasoline, diesel fuel, heating oil, etc. It is not clear from the DPEIS whether any regulated USTs or ASTs would be impacted by the re-use of some facilities at NASA Langley. It is advised that the removal or disturbance of any regulated UST or AST currently in use be reported to the DEQ Tidewater Regional Office.

There have been 6 petroleum releases reported at the west area of LaRC, all of which are closed cases. The east area of LaRC is located on Langley Air Force Base (LaAFB). There have been 3 petroleum releases reported at LaAFB which are adjacent to the east area of LaRC. These closed cases include PC#s 1990-1239, 1993-0927, and 1998-2368.

If evidence of a petroleum release is discovered during any future construction that may occur at LaRC, it must be reported to DEQ. Contact Rebecca Gehring, DEQ-TRO at (757) 518-2190 or Gene Siudyla, DEQ-TRO at (757) 518-2117. Petroleum contaminated soils and ground water must be characterized and disposed of properly.

For any future construction that includes the use of portable AST storage (>660 gallons) for equipment fuel, the tank(s) must be registered with DEQ using AST Registration form 7540-AST. Any questions concerning UST or AST registration may be directed to Tom Madigan, DEQ-TRO (757) 518-2115 or [temadigan@deq.virginia.gov](mailto:temadigan@deq.virginia.gov).

**8. Pesticides.** DEQ recommends that the use of herbicides or pesticides for construction or landscape maintenance should be in accordance with the principles of integrated pest management. The least toxic pesticides that are effective in controlling the target species should be used. Please contact the Department of Agriculture and Consumer Services at (804) 786-3501 for more information.



Comments from the Virginia Office of Environmental Impact Review (cont.):

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**9. Natural Heritage Resources.** The Department of Conservation and Recreation's Division of Natural Heritage (DNH) can search its Biotics Data System (BDS) for occurrences of natural heritage resources in the area of any future construction related to this proposal. Natural heritage resources are defined as the habitat of rare, threatened, or endangered animal and plant species, unique or exemplary natural communities, and significant geologic communities.

Under a Memorandum of Agreement established between the Virginia Department of Agriculture and Consumer Services (VDACS) and the Department of Conservation and Recreation (DCR), DCR has the authority to report for VDACS on state-listed plant and insect species. We recommend that the DNH be contacted at (804) 786-7951, to secure updated information on natural heritage resources, prior to construction, should any construction or expansion occur in the future as a result of program activities.

**10. Wildlife Resources.** The Department of Game and Inland Fisheries (DGIF), as the Commonwealth's wildlife and freshwater fish management agency, exercises enforcement and regulatory jurisdiction over wildlife and freshwater fish, including state or federally listed endangered or threatened species, but excluding listed insects (*Virginia Code* Title 29.1). DGIF is a consulting agency under the U.S. Fish and Wildlife Coordination Act (16 U.S.C. sections 661 *et seq.*), and provides environmental analysis of projects or permit applications coordinated through DEQ and several other state and federal agencies. DGIF determines likely impacts upon fish and wildlife resources and habitat, and recommends appropriate measures to avoid, reduce, or compensate for those impacts.

DGIF maintains an online database, the Virginia Fish and Wildlife Information Service (VAFWIS), that contains up-to-date information on fish and wildlife resources, including threatened and endangered species. Basic access to this database is available via DGIF's website (<http://vafwis.org/WIS/ASP/default.asp>). DGIF recommends use of VAFWIS during the initial environmental review of any project. A greater level of access to the VAFWIS is available with a subscription. Alternatively, applicants can request a formal review by VAFWIS staff. For more information on this service, contact Shirl Dressler at (804) 367-6913. For additional information and coordination, contact Amy Ewing, DGIF, at (804) 367-2211.

**11. Forest Resources.** In order to protect trees not slated for removal from the effects of any future program construction, NASA should mark and fence them at least to the dripline or the end of the root system, whichever extends farther from the tree stem. Marking should be done with highly visible ribbon so that equipment operators see the protected areas easily. The parking, stacking, and moving of heavy equipment and construction materials near trees can damage root systems by compacting the soil. Soil compaction, from weight or vibration, affects root growth, water and nutrient uptake, and gas exchange. If parking and stacking are unavoidable, NASA should use

**Comments from the Virginia Office of Environmental Impact Review (cont.):**

Page 10

temporary crossing bridges or mats to minimize soil compaction and mechanical injury to plants.

Any stockpiling of soil should take place away from trees. Piling soil at a tree stem can kill the root system of the tree. Soil stockpiles should be covered, as well, to prevent soil erosion and fugitive dust. Questions on tree protection may be directed to the Department of Forestry, Todd Groh, at (434) 220-9044.

**12. Historic Structures and Archaeological Resources.** NASA, as a federal agency, must consider the effects of its actions on historic properties listed in or eligible for the National Register of Historic Places and provide the Advisory Council on Historic Preservation the opportunity to comment in accordance with Sections 106 of the National Historic Preservation Act, as amended, and its implementing regulation 36 CFR 800. The Section 106 review process begins when NASA provides a description of the undertaking and its Area of Potential Effect (APE) to the State Historic Preservation Officer (SHPO), which in Virginia is DHR. NASA must consult directly with DHR on this undertaking.

For any future submissions 36 CFR 800.8 allows federal agencies to coordinate Section 106 compliance during the National Environmental Policy Act (NEPA) review process. However, NASA must inform the SHPO (DHR) early in the process that it intends to do so. NASA must also ensure that the environmental documentation prepared under NEPA presents information about historic properties and potential effects to such resources at a level of detail that allows the SHPO and other consulting parties to comment. For additional information and coordination, contact Ethel Eaton, DHR, at (804) 367-2323, Ext. 112.

**Federal Consistency under the Coastal Zone Management Act**

Pursuant to the Coastal Zone Management Act of 1972, as amended, prior to initiating activities, NASA LaRC is required to determine the consistency of its activities affecting Virginia's coastal resources or coastal uses with the Virginia Coastal Resources Management Program (see section 307(c)(1) of the Act and 15 CFR Part 930, sub-part C, section 930.34). This involves an analysis of the activities in light of the Enforceable Policies of the VCP (see attached), and submission of a consistency determination reflecting that analysis and committing NASA LaRC's actions to be consistent with the Enforceable Policies. We encourage NASA to consider the Advisory Policies of the VCP as well (Attachment 2).

The DPEIS did not contain a consistency determination for the project. This determination may be provided as part of the final PEIS concluding the NEPA process, or independently, depending on your agency's preference. A consistency determination for each proposed project must be submitted to DEQ for coordinated review prior to construction. Section 930.39 gives content requirements for the consistency

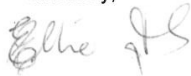
**Comments from the Virginia Office of Environmental Impact Review (cont.):**

Page 11

determination, or you may visit the DEQ Website at,  
<http://www.deq.state.va.us/eir/federal.html>.

Thank you for the opportunity to review the Draft Constellation Programmatic Environmental Impact Statement. Detailed comments of reviewing agencies are attached for your review. Please contact me at (804) 698-4325 or John Fisher at (804) 698-4339 for clarification of these comments.

Sincerely,



Ellie Irons, Manager  
Office of Environmental Impact Review

Enclosures

cc: Paul Kohler, DEQ-ORP  
Michelle Hollis, DEQ-TRO  
Tony Watkinson, VMRC  
Amy Ewing, DGIF  
Robbie Rhur, DCR  
Keith R. Tignor, VDACS  
Todd Groh, DOF  
Matt Heller, DMME  
Ethel Eaton, DHR  
Mary Stanley, VDOT  
Brian Ballard, City of Hampton  
Arthur Collins, Hampton Roads PDC

Comments from the Virginia Office of Environmental Impact Review (cont.):



COMMONWEALTH of VIRGINIA

L. Preston Bryant, Jr.  
Secretary of Natural Resources

DEPARTMENT OF ENVIRONMENTAL QUALITY  
Street address: 629 East Main Street, Richmond, Virginia 23219  
Mailing address: P. O. Box 10009, Richmond, Virginia 23240  
Fax (804) 698-4500 TDD (804) 698-4021  
www.deq.virginia.gov

David K. Paylor  
Director

(804) 698-4000  
1-800-592-5482

Attachment 1

**Enforceable Regulatory Programs comprising Virginia's Coastal Resources Management Program (VCP)**

- a. Fisheries Management - The program stresses the conservation and enhancement of finfish and shellfish resources and the promotion of commercial and recreational fisheries to maximize food production and recreational opportunities. This program is administered by the Marine Resources Commission (VMRC); Virginia Code 28.2-200 to 28.2-713 and the Department of Game and Inland Fisheries (DGIF); Virginia Code 29.1-100 to 29.1-570.

The State Tributyltin (TBT) Regulatory Program has been added to the Fisheries Management program. The General Assembly amended the Virginia Pesticide Use and Application Act as it related to the possession, sale, or use of marine antifoulant paints containing TBT. The use of TBT in boat paint constitutes a serious threat to important marine animal species. The TBT program monitors boating activities and boat painting activities to ensure compliance with TBT regulations promulgated pursuant to the amendment. The VMRC, DGIF, and Virginia Department of Agriculture Consumer Services (VDACS) share enforcement responsibilities; Virginia Code 3.1-249.59 to 3.1-249.62.

- b. Subaqueous Lands Management - The management program for subaqueous lands establishes conditions for granting or denying permits to use state-owned bottomlands based on considerations of potential effects on marine and fisheries resources, tidal wetlands, adjacent or nearby properties, anticipated public and private benefits, and water quality standards established by the Department of Environmental Quality (DEQ). The program is administered by the Marine Resources Commission; Virginia Code 28.2-1200 to 28.2-1213.
- c. Wetlands Management - The purpose of the wetlands management program is to preserve wetlands, prevent their despoliation, and accommodate economic development in a manner consistent with wetlands preservation.
- (1) The tidal wetlands program is administered by the Marine Resources Commission; Virginia Code 28.2-1301 through 28.2-1320.
- (2) The Virginia Water Protection Permit program administered by DEQ includes protection of wetlands --both tidal and non-tidal; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.



Comments from the Virginia Office of Environmental Impact Review (cont.):

Attachment 1 continued

Page 2

- d. Dunes Management - Dune protection is carried out pursuant to The Coastal Primary Sand Dune Protection Act and is intended to prevent destruction or alteration of primary dunes. This program is administered by the Marine Resources Commission; Virginia Code 28.2-1400 through 28.2-1420.
- e. Non-point Source Pollution Control – (1) Virginia's Erosion and Sediment Control Law requires soil-disturbing projects to be designed to reduce soil erosion and to decrease inputs of chemical nutrients and sediments to the Chesapeake Bay, its tributaries, and other rivers and waters of the Commonwealth. This program is administered by the Department of Conservation and Recreation; Virginia Code 10.1-560 et seq..  
  
(2) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater (see i) Virginia; Virginia Code §10.1-2100 –10.1-2114 and 9 VAC10-20 et seq.
- f. Point Source Pollution Control - The point source program is administered by the State Water Control Board (DEQ) pursuant to Virginia Code, 62.1-44.15. Point source pollution control is accomplished through the implementation of:
  - (1) the National Pollutant Discharge Elimination System (NPDES) permit program established pursuant to Section 402 of the federal Clean Water Act and administered in Virginia as the Virginia Pollutant Discharge Elimination System (VPDES) permit program.
  - (2) The Virginia Water Protection Permit (VWPP) program administered by DEQ; Virginia Code §62.1-44.15:5 and Water Quality Certification pursuant to Section 401 of the Clean Water Act.
- g. Shoreline Sanitation - The purpose of this program is to regulate the installation of septic tanks, set standards concerning soil types suitable for septic tanks, and specify minimum distances that tanks must be placed away from streams, rivers, and other waters of the Commonwealth. This program is administered by the Department of Health (Virginia Code 32.1-164 through 32.1-165).
- h. Air Pollution Control - The program implements the federal Clean Air Act to provide a legally enforceable State Implementation Plan for the attainment and maintenance of the National Ambient Air Quality Standards. This program is administered by the State Air Pollution Control Board (Virginia Code, 10.1-1300 through §10.1-1320).
- (i) Coastal Lands Management is a state-local cooperative program administered by the DCR's Division of Chesapeake Bay Local Assistance and 84 localities in Tidewater, Virginia established pursuant to the Chesapeake Bay Preservation Act; Virginia Code §10.1-2100 –10.1-2114 and Chesapeake Bay Preservation Area Designation and Management Regulations; Virginia Administrative Code 9 VAC10-20 et seq.



Comments from the Virginia Office of Environmental Impact Review (cont.):

Attachment 2

Advisory Policies for Geographic Areas of Particular Concern

- a. Coastal Natural Resource Areas - These areas are vital to estuarine and marine ecosystems and/or are of great importance to areas immediately inland of the shoreline. Such areas receive special attention from the Commonwealth because of their conservation, recreational, ecological, and aesthetic values. These areas are worthy of special consideration in any planning or resources management process and include the following resources:
  - a) Wetlands
  - b) Aquatic Spawning, Nursery, and Feeding Grounds
  - c) Coastal Primary Sand Dunes
  - d) Barrier Islands
  - e) Significant Wildlife Habitat Areas
  - f) Public Recreation Areas
  - g) Sand and Gravel Resources
  - h) Underwater Historic Sites.
- b. Coastal Natural Hazard Areas - This policy covers areas vulnerable to continuing and severe erosion and areas susceptible to potential damage from wind, tidal, and storm related events including flooding. New buildings and other structures should be designed and sited to minimize the potential for property damage due to storms or shoreline erosion. The areas of concern are as follows:
  - i) Highly Erodible Areas
  - ii) Coastal High Hazard Areas, including flood plains.
- c. Waterfront Development Areas - These areas are vital to the Commonwealth because of the limited number of areas suitable for waterfront activities. The areas of concern are as follows:
  - i) Commercial Ports
  - ii) Commercial Fishing Piers
  - iii) Community Waterfronts

Although the management of such areas is the responsibility of local government and some regional authorities, designation of these areas as Waterfront Development Areas of Particular Concern (APC) under the VCRMP is encouraged. Designation will allow the use of federal CZMA funds to be used to assist planning for such areas and the implementation of such plans. The VCRMP recognizes two broad classes of priority uses for waterfront development APC:

- i) water access dependent activities;
- ii) activities significantly enhanced by the waterfront location and complementary to other existing and or planned activities in a given waterfront area.

**Comments from the Virginia Office of Environmental Impact Review (cont.):**

**Advisory Policies for Shorefront Access Planning and Protection**

- a. Virginia Public Beaches - Approximately 25 miles of public beaches are located in the cities, counties, and towns of Virginia exclusive of public beaches on state and federal land. These public shoreline areas will be maintained to allow public access to recreational resources.
- b. Virginia Outdoors Plan - Planning for coastal access is provided by the Department of Conservation and Recreation in cooperation with other state and local government agencies. The Virginia Outdoors Plan (VOP), which is published by the Department, identifies recreational facilities in the Commonwealth that provide recreational access. The VOP also serves to identify future needs of the Commonwealth in relation to the provision of recreational opportunities and shoreline access. Prior to initiating any project, consideration should be given to the proximity of the project site to recreational resources identified in the VOP.
- c. Parks, Natural Areas, and Wildlife Management Areas - Parks, Wildlife Management Areas, and Natural Areas are provided for the recreational pleasure of the citizens of the Commonwealth and the nation by local, state, and federal agencies. The recreational values of these areas should be protected and maintained.
- d. Waterfront Recreational Land Acquisition - It is the policy of the Commonwealth to protect areas, properties, lands, or any estate or interest therein, of scenic beauty, recreational utility, historical interest, or unusual features which may be acquired, preserved, and maintained for the citizens of the Commonwealth.
- e. Waterfront Recreational Facilities - This policy applies to the provision of boat ramps, public landings, and bridges which provide water access to the citizens of the Commonwealth. These facilities shall be designed, constructed, and maintained to provide points of water access when and where practicable.
- f. Waterfront Historic Properties - The Commonwealth has a long history of settlement and development, and much of that history has involved both shorelines and near-shore areas. The protection and preservation of historic shorefront properties is primarily the responsibility of the Department of Historic Resources. Buildings, structures, and sites of historical, architectural, and/or archaeological interest are significant resources for the citizens of the Commonwealth. It is the policy of the Commonwealth and the VCRMP to enhance the protection of buildings, structures, and sites of historical, architectural, and archaeological significance from damage or destruction when practicable.

Comments from the Virginia Office of Environmental Impact Review (cont.):



DEPARTMENT OF ENVIRONMENTAL QUALITY  
TIDEWATER REGIONAL OFFICE  
ENVIRONMENTAL IMPACT REVIEW COMMENTS

September 11, 2007

PROJECT NUMBER: 07-143F

PROJECT TITLE: Constellation

As Requested, TRO staff has reviewed the supplied information and has the following comments:

**Petroleum Storage Tank Cleanups:**

This proposed project will include use of existing facilities located at both the west and east areas of NASA Langley Research Center (LaRC). The draft EIS did not provide any details of proposed construction at the existing facilities. There have been 6 petroleum releases reported at the west area of LaRC, all of which are closed cases (see Figure 3-16). The east area of LaRC is located on Langley Air Force Base (LaAFB) (see Figure 3-17). There have been 3 petroleum releases reported at LaAFB which are adjacent to the east area of LaRC. These closed cases include PC#s 1990-1239, 1993-0927, and 1998-2368. If evidence of a petroleum release is discovered during construction of this project, it must be reported to DEQ. Contact Ms. Rebecca Gehring at (757) 518-2190 or Mr. Gene Siudyla at (757) 518-2117. Petroleum contaminated soils and ground water generated during construction of this project must be properly characterized and disposed of properly.

**Petroleum Storage Tank Compliance/Inspections:**

The proposed Constellation facility in the Tidewater Region, NASA Langley Research Center, (CEDS Facility # 5001411) currently operates 5 regulated underground storage tanks (USTs) and 9 regulated aboveground storage tanks (ASTs) for the storage and dispensing of various petroleum products including gasoline, diesel fuel, heating oil, etc. It is not clear from the EIS whether any regulated USTs or ASTs would be impacted by the re-use of some facilities at NASA Langley. It is advised that the removal or disturbance of any regulated UST or AST currently in use be reported to the DEQ Tidewater Regional Office (see contact information below)

In addition to the above, if the construction of this project will include the use of portable AST storage (>660 gallons) for equipment fuel, the tank or tanks must be registered with DEQ using AST Registration form 7540-AST. This form is available at the [DEQ web site \(deq.virginia.gov\)](http://deq.virginia.gov) under "petroleum programs, download library, AST registration forms". Once the registration form is completed, it should be mailed to the DEQ address on the form along with the appropriate registration fee (also listed on the form). Any questions concerning UST or AST registration should be directed to "Tom Madigan" at the Tidewater Regional Office 5636 Southern Boulevard, Virginia Beach, VA 23462, (757) 518-2115 or by e-mail at [temadigan@deq.virginia.gov](mailto:temadigan@deq.virginia.gov)

**Virginia Water Protection Permit Program (VWPP):**

No comments

**Air Permit Program :**

No comments.

**Comments from the Virginia Office of Environmental Impact Review (cont.):**



DEPARTMENT OF ENVIRONMENTAL QUALITY  
TIDEWATER REGIONAL OFFICE  
ENVIRONMENTAL IMPACT REVIEW COMMENTS

September 11, 2007

**PROJECT NUMBER:** 07-143F

**PROJECT TITLE:** Constellation

**Water Permit Program :**

Comment on this document is limited to the NASA Langley facility only. No permits under the jurisdiction of the DEQ/TRO Water Permit Section are required for the activities described in this document.

**Waste Permit Program :**

Comment on this document is limited to the NASA Langley facility only. The document recognizes the need to manage waste in accordance with the Virginia Hazardous Waste Management Program and the Virginia Solid Waste Management Program. Based on the management program presented it appears no waste management permits are required.

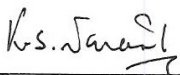
The staff from the Tidewater Regional Office thanks you for the opportunity to provide comments.

Sincerely,

Michelle R. Hollis  
Environmental Specialist  
5636 Southern Blvd.  
VA Beach, VA 23462  
(757) 518-2146  
(757) 518-2009 Fax  
mrhollis@deq.virginia.gov



Comments from the Virginia Office of Environmental Impact Review (cont.):

<b>DEPARTMENT OF ENVIRONMENTAL QUALITY DIVISION OF AIR PROGRAM COORDINATION</b>	
<b><u>ENVIRONMENTAL REVIEW COMMENTS APPLICABLE TO AIR QUALITY</u></b>	
TO: John E. Fisher	DEQ - OEIA PROJECT NUMBER: <b><u>07-143F</u></b>
PROJECT TYPE:	<input type="checkbox"/> STATE EA / EIR <input checked="" type="checkbox"/> FEDERAL EA / EIS <input type="checkbox"/> SCC <input type="checkbox"/> CONSISTENCY DETERMINATION/CERTIFICATION
PROJECT TITLE: <b><u>CONSTELLATION</u></b>	
PROJECT SPONSOR: <b><u>NATIONAL AERONAUTICS AND SPACE ADMINISTRATION</u></b>	
PROJECT LOCATION: <b><u>X OZONE MAINTENANCE AREA</u></b>	
REGULATORY REQUIREMENTS MAY BE APPLICABLE TO: <input checked="" type="checkbox"/> CONSTRUCTION <input checked="" type="checkbox"/> OPERATION	
STATE AIR POLLUTION CONTROL BOARD REGULATIONS THAT MAY APPLY:	
1. <input type="checkbox"/> 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 E – STAGE I	
2. <input type="checkbox"/> 9 VAC 5-40-5200 C & 9 VAC 5-40-5220 F – STAGE II Vapor Recovery	
3. <input type="checkbox"/> 9 VAC 5-40-5490 et seq. – Asphalt Paving operations	
4. <input checked="" type="checkbox"/> 9 VAC 5-40-5600 et seq. – Open Burning	
5. <input checked="" type="checkbox"/> 9 VAC 5-50-60 et seq. Fugitive Dust Emissions	
6. <input type="checkbox"/> 9 VAC 5-50-130 et seq. – Odorous Emissions; Applicable to _____	
7. <input type="checkbox"/> 9 VAC 5-50-160 et seq. – Standards of Performance for Toxic Pollutants	
8. <input type="checkbox"/> 9 VAC 5-50-400 Subpart _____, Standards of Performance for New Stationary Sources, designates standards of performance for the _____	
9. <input type="checkbox"/> 9 VAC 5-80-10 et seq. of the regulations – Permits for Stationary Sources	
10. <input type="checkbox"/> 9 VAC 5-80-1700 et seq. Of the regulations – Major or Modified Sources located in PSD areas. This rule may be applicable to the _____	
11. <input type="checkbox"/> 9 VAC 5-80-2000 et seq. of the regulations – New and modified sources located in non-attainment areas	
12. <input type="checkbox"/> 9 VAC 5-80-800 et seq. Of the regulations – Operating Permits and exemptions. This rule may be applicable to _____	
COMMENTS SPECIFIC TO THE PROJECT:	
Being in an ozone maintenance area, all precautions are necessary to restrict the emissions of volatile organic compounds (VOC) and oxides of nitrogen (NO <sub>x</sub> ) during the proposed activities at Langley Research Center.	
<div style="display: flex; justify-content: space-between; align-items: flex-end;"><div style="text-align: center;"> (Kotur S. Narasimhan) Office of Air Data Analysis</div><div>DATE: August 31, 2007</div></div>	

RECEIVED

AUG 31 2007

DEQ-Office of Environmental Impact Review

Comments from the Virginia Office of Environmental Impact Review (cont.):



RECEIVED  
SEP 18 2007  
DEQ Office of Environmental  
Impact Review

**MEMORANDUM**

**TO:** John Fisher, Environmental Program Planner  
*pk*  
**FROM:** Paul Kohler, Waste Division Environmental Review Coordinator  
**DATE:** September 18, 2007  
**COPIES:** Sanjay Thirunagari, Waste Division Environmental Review Manager; file  
**SUBJECT:** Environmental Impact Report; Constellation; DEQ Project Code 07-143F

The Waste Division has completed its review of the Consistency Determination report for the Constellation project in Hampton, Virginia. We have the following comments concerning the waste issues associated with this project:

This is a multi-state project and the scope is extensive. For each area in Virginia where any work is to take place, the applicant needs to conduct an environmental investigation on and near the property to identify any solid or hazardous waste sites or issues before work can commence. This investigation should include a search of waste-related databases. Please see the attached page regarding this database search. A GPS database search was conducted but did not reveal any waste sites that would impact or be impacted by the subject site. Paul Herman of DEQ's Federal Facility program was consulted for his comments and he will respond in a separate memo if he has additional comments.

Any soil that is suspected of contamination or wastes that are generated must be tested and disposed of in accordance with applicable Federal, State, and local laws and regulations. Some of the applicable state laws and regulations are: Virginia Waste Management Act, Code of Virginia Section 10.1-1400 *et seq.*; Virginia Hazardous Waste Management Regulations (VHWMR) (9VAC 20-60); Virginia Solid Waste Management Regulations (VSWMR) (9VAC 20-80); Virginia Regulations for the Transportation of Hazardous Materials (9VAC 20-110). Some of the applicable Federal laws and regulations are: the Resource Conservation and Recovery Act (RCRA), 42 U.S.C. Section 6901 *et seq.*, and the applicable regulations contained in Title 40 of the Code of Federal Regulations; and the U.S. Department of Transportation Rules for Transportation of Hazardous materials, 49 CFR Part 107.

Also, structures to be demolished should be checked for asbestos-containing materials (ACM) and lead-based paint (LBP) prior to demolition. If ACM or LBP are found, in addition to the federal waste-related regulations mentioned above, State regulations 9VAC 20-80-640 for ACM and 9VAC 20-60-261 for LBP must be followed.

**Comments from the Virginia Office of Environmental Impact Review (cont.):**

Please note that DEQ encourages all construction projects and facilities to implement pollution prevention principles, including the reduction, reuse, and recycling of all solid wastes generated. All generation of hazardous wastes should be minimized and handled appropriately.

If you have any questions or need further information, please contact Paul Kohler at (804) 698-4208.

Attachment: Waste Information

**Comments from the Virginia Office of Environmental Impact Review (cont.):**

**Waste Information**

There are four Waste Division databases that are to be used to complete this review. These are the Solid Waste Database, CERCLA Facilities, Voluntary Remediation Program, and Hazardous Waste Facilities databases.

**The Solid Waste Database**

A list of active solid waste facilities in Virginia.

**CERCLA Facilities Database**

A list of active and archived CERCLA (EPA Superfund Program) sites.

**Hazardous Waste Facilities Database**

A list of hazardous waste generators, hazardous waste transporters, and hazardous waste storage and disposal facilities. Data for the CERCLA Facilities and Hazardous Waste Facilities databases are periodically downloaded by the Waste Division from U.S. EPA's website.

**Accessing the DEQ Databases:**

The report author should access this information on the DEQ website at <http://www.deq.state.va.us/waste/waste.html>. Scroll down to the databases which are listed under Real Estate Search Information heading.

The *solid waste information* can be accessed by clicking on the Solid Waste Database tab and opening the file. Type the county or city name and the word County or City, and click the Preview tab. All active solid waste facilities in that locality will be listed.

The *Superfund information* will be listed by clicking on the Search EPA's CERCLIS database tab and opening the file. Click on the locality box, click on sort, then click on Datasheet View. Scroll to the locality of interest.

The *hazardous waste* information can be accessed by clicking on the Hazardous Waste Facility tab. Go to the Geography Search section and fill in the name of the city or county and VA in the state block, and hit enter. The hazardous waste facilities in the locality will be listed.


The *Voluntary Remediation Program* GPS database can be accessed by clicking on "Voluntary Remediation," then "What's in my backyard" in the center shaded area, and then under "Mapping Applications," click on "What's in my backyard" again.

This database search will include most waste-related site information for each locality. In many cases, especially when the project is located in an urban area, the database output for that locality will be extensive.



Comments from the Virginia Office of Environmental Impact Review (cont.):

09/25/2007 14:43 FAX 001/001

**HAMPTON ROADS**  
PLANNING DISTRICT COMMISSION

PAUL D. FRAM, CHAIRMAN • BRUCE C. GOODSON, VICE CHAIRMAN • JAMES O. McREYNOLDS, TREASURER  
ARTHUR L. COLLINS, EXECUTIVE DIRECTOR/SECRETARY

**CHESAPEAKE**  
Rebecca C.W. Adams, Council Member  
Amer Dworkanah, Deputy City Manager  
Clifton E. Hayes, Council Member  
William E. Harrell, City Manager  
Ella P. Ward, Council Member

**FRANKLIN**  
Joseph J. Sosnowicz, Council Member  
Rowland L. Taylor, City Manager

**GLOUCESTER COUNTY**  
John J. Adams, Sr., Board Member  
Williams H. Whitley, County Administrator

**HAMPTON**  
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Ross A. Kearney, II, Mayor  
Jesse T. Wallace, Jr., City Manager

**ISLE OF WIGHT COUNTY**  
W. Douglas Caskey, County Administrator  
Stan D. Clark, Vice Chairman

**JAMES CITY COUNTY**  
Bruce C. Goodson, Chairman  
Sanford B. Wanner, County Administrator

**NEWPORT NEWS**  
Charles C. Allen, Vice Mayor  
Joe S. Frank, Mayor  
Randy W. Hildebrandt, City Manager

**NORFOLK**  
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Paul D. Fram, Mayor  
Dr. Theresa W. Whitley, Council Member  
Regina V.K. Williams, City Manager  
Barclay C. Winn, Council Member

**POQUOSON**  
Charles W. Burgess, Jr., City Manager  
Gordon C. Heisel, Jr., Mayor

**PORTSMOUTH**  
Kenneth L. Chandler, City Manager  
Douglas L. Smith, Council Member

**SOUTHAMPTON COUNTY**  
Anita T. Felts, Board Member  
Michael W. Johnson, County Administrator

**SUFFOLK**  
Linda T. Johnson, Mayor  
James G. Vacalis, City Manager

**SURRY COUNTY**  
Tyrone W. Franklin, County Administrator  
Judy S. Lytle, Board Member

**VIRGINIA BEACH**  
Harry E. Diesel, Council Member  
Robert M. Dyer, Council Member  
Barbara M. Henley, Council Member  
Louis R. Jones, Vice Mayor  
Meyers E. Oberndorf, Mayor  
James K. Spore, City Manager  
John E. Uhrin, Council Member

**WILLIAMSBURG**  
Jackson C. Tuttle, II, City Manager  
Jeanne Zedler, Mayor

**YORK COUNTY**  
James O. McReynolds, County Administrator  
Thomas G. Sheppard, Jr., Board Member

September 13, 2007

Mr. John E. Fisher  
Department of Environmental Quality  
Office of Environmental Impact Review  
629 East Main Street, Sixth Floor  
Richmond, Virginia 23219


Re: Constellation DEQ 07-143F (ENV:GEN)

Dear Mr. Fisher:

Pursuant to your request of August 22, 2007, the staff of the Hampton Roads Planning District Commission has reviewed the Draft Environmental Impact Statement for the proposed Constellation program at the National Aeronautics and Space Administration. We have contacted the City of Hampton regarding the project.

Based on this review, the project is generally consistent with local and regional plans and policies. In addition, the City of Hampton notes that the project may help to bring new research activity to NASA Langley.

We appreciate the opportunity to review this project. If you have any questions, please do not hesitate to call.

Sincerely,  
  
Arthur L. Collins  
Executive Director/Secretary

MLJ/fh  
Copies: Mr. James Freas, HA

**MAILED**  
**SEP 18 2007**  
**HRPDC**

HEADQUARTERS • THE REGIONAL BUILDING • 723 WOODLAKE DRIVE • CHESAPEAKE, VIRGINIA 23120 • (757) 420-8300  
PENINSULA OFFICE • 2101 EXECUTIVE DRIVE • SUITE C • HAMPTON, VIRGINIA 23166 • (757) 262-0094

**Response to comments from the Virginia Office of Environmental Impact Review:**

Thank you for your comments.

In response to the comment, “The DPEIS did not contain a consistency determination for the project. This determination may be provided as part of the final PEIS concluding the NEPA process...”, the following paragraph has been added to Section 3.1.7.1 in the Final PEIS:

“LaRC is located within the “coastal zone” as defined under the Virginia Department of Environmental Quality Virginia Coastal Zone Management Program. Under the Virginia Coastal Resources Management Program a network of state agencies and local governments administer enforceable laws, regulations, and policies in the following areas: tidal and nontidal wetlands, fisheries, subaqueous lands, dunes and beaches, point source air pollution, point source water pollution, nonpoint source water pollution, shoreline sanitation, and coastal lands. All Federal actions and programs that directly affect Virginia’s coastal zone must be carried out in a manner that is consistent with the enforceable policies comprising Virginia’s Coastal Resources Management Program. Virginia Department of Environmental Quality Office of Environmental Impact Review may review Federal projects for consistency with enforceable policies during the NEPA process. Not all of these enforceable programs are applicable to the Proposed Action.”

In addition, the following paragraph has been added in Section 4.1.1.7.1:

“LaRC is located within the “coastal zone” as defined under the Virginia Department of Environmental Quality’s Virginia Coastal Resources Management Program. Therefore, the proposed activities under the Constellation Program must be consistent with the Virginia Coastal Resources Management Program’s enforceable policies regarding coastal resources. Given the location and nature of activities to be conducted at LaRC under the Proposed Action, the following enforceable policies would not be applicable: fisheries, subaqueous land, wetlands, dunes and beaches, and shoreline sanitation. Pollution control (point and non-point source) and air pollution would be in accordance with existing Virginia Department of Environmental Quality permits as further detailed in Sections 4.1.1.7.2 and 4.1.1.7.3, respectively. LaRC has determined that these activities can be implemented within the existing framework of environmental regulations and would be consistent with the enforceable programs and advisory policies of the Virginia Coastal Resources Management Program.”

**Comment from the Brevard County Natural Resources Management Office:**

**From:** Coles, Deborah S [Debbie.Coles@brevardcounty.us] **Sent:** Fri 9/28/2007 5:05 PM

**To:** NASA-Cx-Environmental-Impact-System

**Subject:** Constellation Programmatic EIS

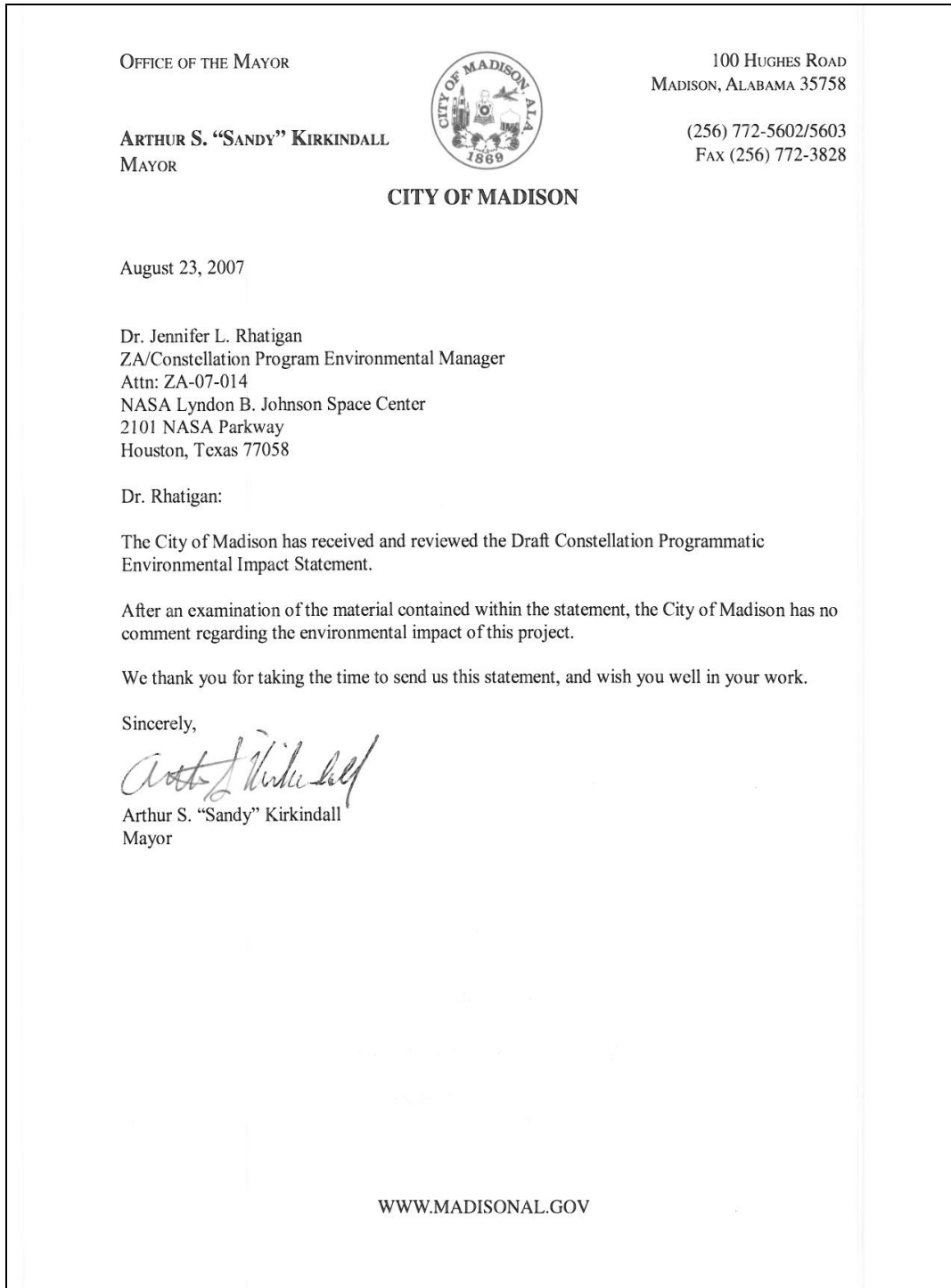
The Brevard County Natural Resources Management Office has reviewed impacts associated with the Constellation Program at the John F. Kennedy Space Center. It is our understanding that the impacts associated with the proposed Ares launches will be similar to those associated with current and historic launch activities. This office has no specific comments at this time.

Regards,  
Debbie Coles  
Special Projects Coordinator IV  
Brevard County Natural Resources Management Office  
2725 Judge Fran Jamieson Way  
Viera, Florida 32940  
(321) 633-2016  
Fax (321) 633-2029  
mailto:debbie.coles@brevardcounty.us

**Response to comment from the Brevard County Natural Resources Management Office:**

Thank you for your comment.

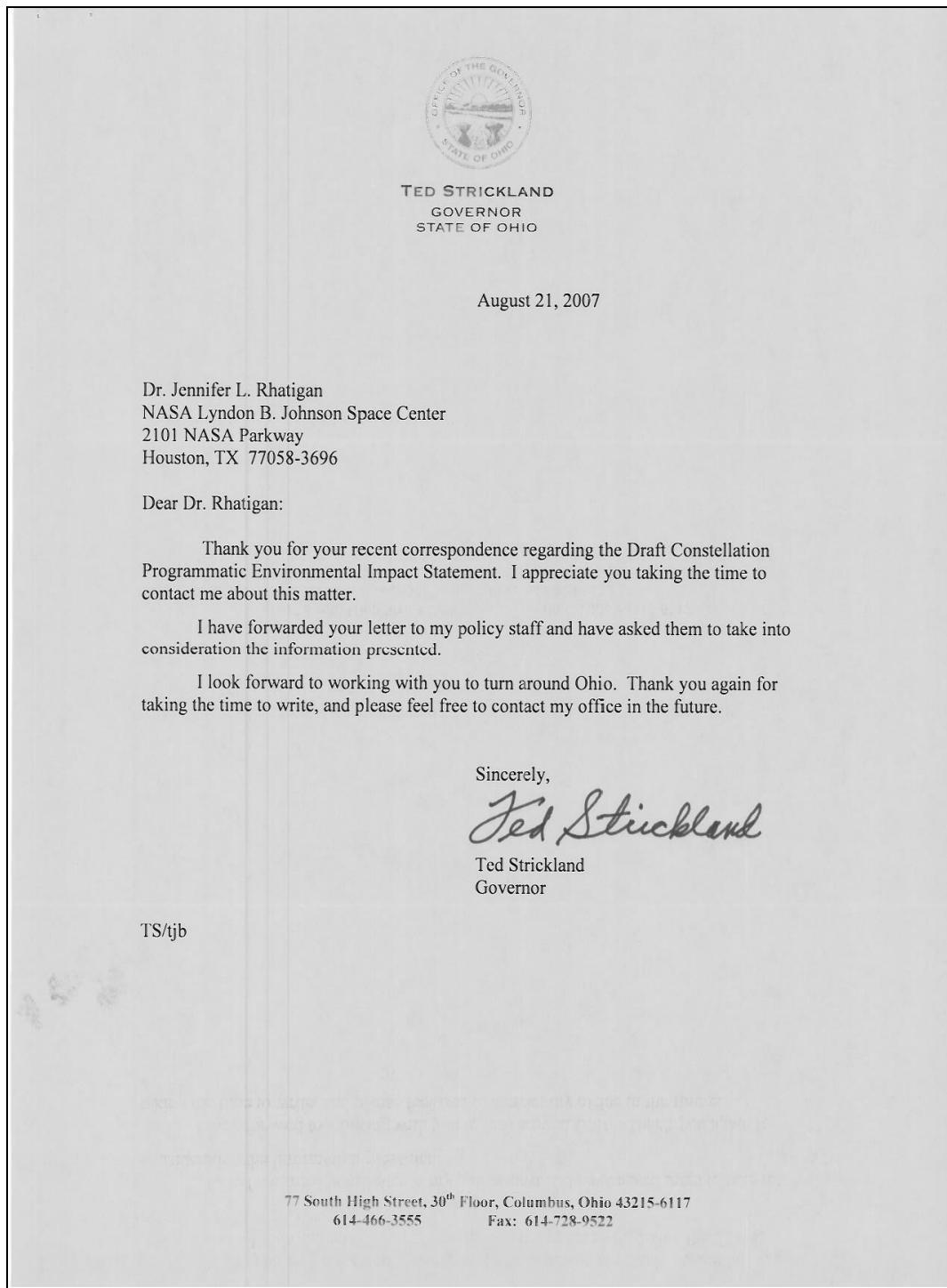
**Comment from the City of Madison, Office of the Mayor, Alabama:**



**Response to comment from the City of Madison, Office of the Mayor, Alabama:**

Thank you for your comment.

**Comment from the Governor of Ohio:**



**Response to comment from the Governor of Ohio:**

Thank you.

**Comments from the National Society of Black Engineers:**

**RESPONSE TO**

**NASA'S  
Constellation Programmatic Environmental Impact Statement  
(PEIS)**

**Author:** Joy Singfield  
Director, Environmental Engineering Special Interest Group  
National Society of Black Engineers

**Dated:** Friday, September 28, 2007

**Response Subject  
Matter:** Metallic Oppositions in Environmental Impact Initiatives

**Abstract:** NASA's Draft Constellation Programmatic Environmental Impact Statement (PEIS) addresses the environmental impacts associated With the Proposed Action and the No Action alternative. NASA's PEIS creates flight systems and Earth-based ground infrastructure required to enable continued access to space and enable future missions. This response is developed to raise awareness of the effects of metals on the environment, and to offer solutions and alternatives to testing, verifying environmental safety with metal testing, and developing metal waste options.

**Comments from the National Society of Black Engineers (cont.):**

**Section Responses to:**

**Metals debris and waste options**

**Using Metals and Testing the effects of Metals.**

The use of metals in launching vehicles brings about debris, which results in environmental effects on land, water, and air. These elements are compromised when vehicles launch, and leave the environment vulnerable to the debris of metal. As mentioned in the Launch Range safety section, it was stated for the probability of metallic toxins to be low. A possible question that may pose as a concern is, how can we be sure the level of accuracy this assumption holds? An alternative testing method would be to conduct a test on the climate, and elements of the Earth, such as land, air, and water prior to the launch, to define the current state of the environment to launching. Once the launch has taken place, a test to determine the condition of the environment after launch, would give an accuracy of the effects the launch has on the environment, by testing and analyzing changes that may have taken place during the transition. More accurate water levels, land quality, and in air purity can be defined by recording the before and after states of the environment. For example, an air purification test measuring the level of purity of air prior to, and after a launch, can determine effects the vehicles have on the environment. This will allow accurate assumptions of the environmental quality after a launch, by measuring the levels and analyzing environmental changes before and after a launch.

One possibility to measure effectiveness would be a test using simulation, or virtual prototype of an actual launch, simulating reactions, to calculate possible preventions and rehabilitation features. This method may increase accurate results, and factor in more precise time limits for environmental recovery from hazardous materials, or toxins that compromise the safety of the environment. This controlled simulation environment, creates a variety of scenarios, and poses possible solutions to make formulations more accurate and effective, to develop changes to produce higher land quality, and concrete measurements that effect and alter environmental possibilities. Utilizing this feature can create limitless launch possibility options, without having to physically launch vehicles, resulting in the strain on the environment. This system will test and measure possible developments, that may cause new design, or mechanical options, that may improve launches more accurately. This simulation tests will preserve the environment, and develop proactive solutions and measurements that can be taken in order to predict, and launch vehicles.

Another option is to test the use of environmentally friendly metals. By setting up to develop new processes for metal coatings, new benefits can be offered to the aerospace component manufacturing.

In order to stop the release of highly toxic metals, their buildup must be prevented during the building process of these vehicles. Carbon based tool coatings may be a possible approach for environmentally friendly forming processes. For example, using the "Molyseal", which does not

**Comments from the National Society of Black Engineers (cont.):**

contain chemicals or materials that are hazardous or toxic or give rise to safety or environmental concerns.

This metal finishing tool can be applied using dipping, painting, or spraying techniques, with short treatment times at low temperature, and is compatible with existing cleaning and pretreatment procedures . The usefulness of this application is, of course, limited to metal debris that is expected to remain intact. Any metals that are pulverized, shattered, or otherwise non-intact will expose untreated interior surface to the environment.

**Metallic Waste Options**

In addition to testing to measure the affects on the environment before, and after testing, a possible asset may be to develop ways to rehabilitate and recover the environment when waste has left its mark on the environment.

Testing the dissolve of metals, gives an idea to the time frame of actual dissolve, and measure against the effects on the environment by determining the time it takes from when metal waste arrives to when it has dissolved. This testing can be done to aid in determining if the time it takes to dissolve the metals has an impact on the environment.

Testing the dissolve of vehicle elements not recovered will make it possible to identify and measure the true effectiveness of the land quality, and accuracy of physical metal dissolve. Determining and implementing material types that result in quick dissolve may prove as an effective possibility in determining environmentally responsible solutions for metallic waste management.



**Response to comments from the National Society of Black Engineers:**

Thank you for your comments.

NASA has considered the potential impact on the environment from both routine launches and accidents of the proposed launch vehicles and spacecraft that would support the Proposed Action. This includes the potential impacts of hazardous materials, propellants, and structural materials that might be used in these vehicles. To a large extent, the proposed launch vehicles are very similar to those currently used by NASA and the U.S. Air Force. Extensive environmental monitoring and assessment programs have led to a good understanding of the scope and magnitude of launch environmental effects.

NASA does not consider the release of metallic toxics from ocean disposal of flight hardware to have substantial environmental impacts. Tables 2-3, 2-4, 2-5, 2-7 and 2-8 list the primary material constituents that are currently being proposed for the Ares I, Ares V, and Orion. The majority of these materials, especially the metals, are not considered “highly toxic.” The metals cited, primarily aluminum, aluminum-lithium alloy, steel, titanium, and nickel-chromium alloy, are commonly used in many other commercial and military applications such as shipping, aircraft, and offshore structures.

NASA has been implementing environmentally preferable solutions over the years for space flight operations and will continue to do so. NASA is continuing to identify alternative technologies and materials that can reduce public or worker risk. NASA’s policy is to use environmentally friendly materials whenever practical. This has resulted in changes to the Space Shuttle over the years and is likely to continue for the Constellation Program.

Each NASA Center works towards reducing the amount of hazardous substance, pollutant, or contaminant entering the waste stream or otherwise released to the environment (including fugitive emissions) prior to recycling, treatment, or disposal; and reducing the hazards to public health and the environment associated with the release of such substances. Each NASA Center has a Pollution Prevention Plan and is required to be compliant with environmental laws and regulations, Presidential Executive Orders, and NASA’s environmental policy and associated directives, as well as each Centers’ own environmental policies and programs.

Comments from the Space Frontier Foundation:



Advancing  
NewSpace

15 First Avenue  
Newark, NY 10960

September 30, 2007

ZA/Environmental Manager  
Constellation Program  
NASA Johnson Space Center  
2101 NASA Parkway  
Houston, TX 77058  
PH: 866.662.7243  
EM: [nasa-cxeis@mail.nasa.gov](mailto:nasa-cxeis@mail.nasa.gov)

RE: Public Comment on the Draft Constellation Programmatic Environmental Impact Statement (PEIS)

Dear Environmental Manager:

We believe there is a potentially grave oversight in the Draft Constellation PEIS with respect to lunar surface systems and future human presence on the Moon. It is critical to not only examine the impact of the Constellation program on the Earth but also how those missions might impact the long-term human settlement of the Moon.\*

The PEIS implicitly takes the position that the National Environmental Policy Act of 1969 (NEPA) was not meant to be extrapolated to apply outside the Earth's atmosphere, and therefore does not in and of itself require an extraterrestrial impact analysis. We agree with that position. However it is important that all space activities treat NEPA compliance in a consistent way. To date, the U.S. government has not taken a clear stance on whether NEPA governs extraterrestrial activities. Therefore, if NASA is taking the position that activities outside the Earth's atmosphere are beyond NEPA jurisdiction, it is vital that this position be made explicit.

Regardless of the applicability of NEPA, we assert that the public policy of the United States should include protecting those space-based resources necessary to sustain and expand human presence and economic activity beyond the Earth. NASA, as an agency of the American government, must take a pro-active environmental stewardship approach to the exploration and development of the Moon. Beyond acting on behalf of an American public consensus on environmental stewardship, the United States Government, including NASA, is legally bound by the Outer Space Treaty to adopt appropriate measures on the Moon so as to avoid harmful contamination.

Article IX of the Outer Space Treaty (1967), states (emphasis added):

*"Parties to the Treaty shall...conduct exploration of [outer space and celestial bodies (including the Moon)] so as to **avoid their harmful contamination** and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter **and, where necessary, shall adopt appropriate measures** for this purpose."*

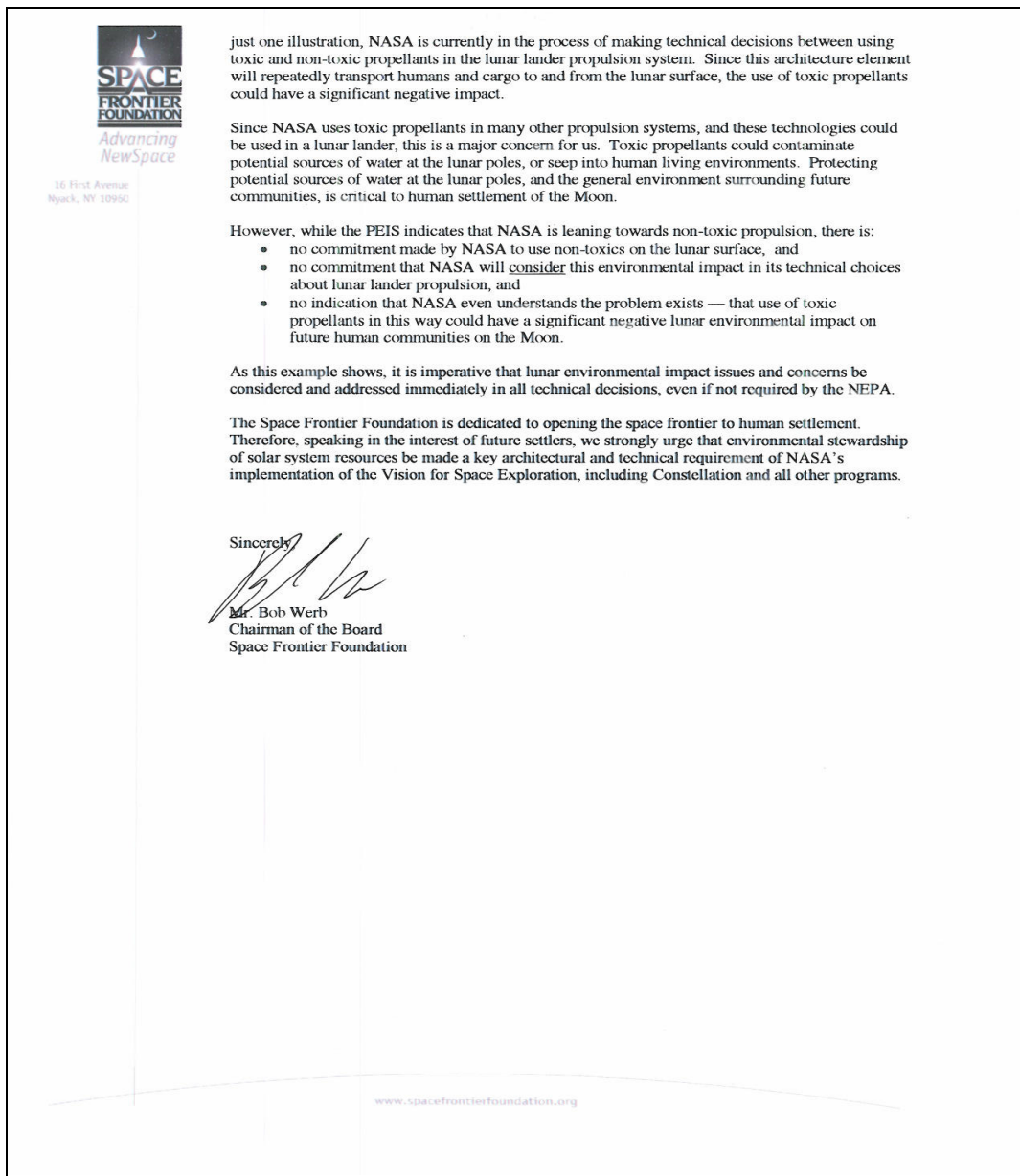
The Treaty further states:

*"If a State Party to the Treaty **has reason to believe** that an **activity** or experiment planned by it or its nationals in outer space, including the Moon, and other celestial bodies, would cause potentially harmful interference with activities of other States' Parties in the peaceful exploration and use of outer space, including the Moon... **it shall undertake appropriate consultations before proceeding** with such activity or experiment."*

Although environmental impacts on the Moon are currently left outside the scope of the PEIS, the lunar activities discussed within the PEIS do raise significant environmental impact issues and concerns. As

\* It has been verbally reported to us that, during the Apollo era, studies on environmental impacts and contamination of the Moon were conducted. Unfortunately, these studies, conducted in 1969/early 1970s, are not electronically archived and we have been unable to locate them.

**Comments from the Space Frontier Foundation (cont.):**



**Response to comments from the Space Frontier Foundation:**

Thank you for your comments.

As stated in your comment letter, NASA takes the position that potential environmental impacts in outer space, including the Moon, are beyond the scope of NEPA analysis.

Your comments and concerns that NASA should consider environmental impacts on the lunar surface as a part of the design process have been referred to the appropriate NASA offices for Constellation Program requirements definition.

**Comment from Rosetta M. Karlen:**

September 28, 2007

ZA/Environmental Manager  
Constellation Program  
NASA Johnson Space Center  
2101 NASA Parkway  
Houston, TX 77058

RE: Constellation PEIS Mailing List

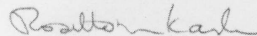
Dear Manager:

Enjoying NASA's website today, I found I can receive information on the PEIS. Please place me on your mailing list for this information, and if it cannot be sent both by printed copy and CD, I would prefer a printed copy.

Being a great fan of the Shuttle program (my 1986 Honda's license plate from 1988 is RTN2SPC), I am happy for the opportunity to receive information regarding the next generation of spacecraft, although nothing will look quite as amazing as a Shuttle launch and landing.

Best wishes on your program.

Sincerely,



Rosetta M. Karlen

[Redacted address information]

**Response to comment from Rosetta M. Karlen:**

Thank you for your comment.